Teachers' Reference

For

Competency Based Assessment

Class IV Mathematics

Bhutan Council for School Examinations and Assessment (BCSEA)

Thimphu: Bhutan

2017

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BACKGROUND

One significant initiative undertaken by the Bhutan Board of Examinations (BBE) was to develop Teachers' Reference for Competency Based Assessment in 2010 as mandated under Performance Compact Chapter 7 of Accelerating Bhutan's Socio-economic Development.

The Teachers' for Competency Based Assessment books (TRCBA) were first developed for Classes V, VII and IX in three subjects (Dzongkha, English and Mathematics) and introduced to all the secondary schools in 2011.

In 2014, a survey was carried out on the usefulness of these books in teaching-learning. Subsequently, based on the feedbacks received from the teachers in the field, the Ministry of Education endorsed the recommendations to further develop the CBA books as teachers' reference for other subjects across the school curricula with an intent to improve both the standard and delivery of quality education in the country.

PURPOSE OF THE BOOK

This booklet comprises of competency based assessment items that can be used to assess competencies across five learning strands in Mathematics. It is intended to serve as a guide for teachers to help them in the classroom teaching and learning process and also be used as model items from which they may draw questions to assess students' competencies. However, it is cautioned that the competency items given in the booklet are in no way prescriptive; they are rather intended to serve as guides, suggestions, or prompts for the improved construction and designing of the items that can enhance the teachers proficiency in item development .

This book not only shows how to develop different types of items; multiple- choice items, closed constructed-response item and open constructed-response item but also higher-order cognitive skills competency items. The items in the book should support teachers in improving their item construction skills and testing strategies and thereby improving; test validity, reliability, fairness and authenticity.

The directly observable competencies, derived from a specific items, provides the evidence that is representative, authentic, and sufficient to teachers for making an inference about the degree of competency (content ,skills and values) that a particular students possess in the due course of time.

The items are designed to make mathematics relevant, meaningful and authentic to Class IV students. CBA items help to measure how well students can apply the mathematical knowledge and skills that they are likely to have learnt at school in real life situations and whether they can extrapolate from what they have learnt: analyze and reason as they pose, interpret and solve problems in a variety of situations.

Competency in mathematics is essential for functioning in everyday life, as well as for success in our increasingly technology –based workplace. Young people who transition to adulthood with limited mathematical competency are likely to find it difficult to participate meaningfully in the society. Understanding of basic mathematical skills is central to young people's preparedness for

life in the modern society. It is a critical tool for young people as they confront issues and challenges related to personal, occupational, societal, and scientific aspects in their lives.

MATHEMATICAL COMPETENCIES

Mathematical competence means the ability to understand, judge, do, and use mathematics in a variety of contexts and in diverse array of situations where mathematics plays a vital role.

There is wide recognition of the need to identify such a set of general mathematical competencies, to complement the role of content knowledge in mathematics learning. These cognitive competencies are available to or learnable by individuals in order to understand and engage with the world in a mathematical way. All these competencies are to do with mental or physical processes, activities, and behaviors. The competency based assessment items demand the individual to demonstrate **eight mathematical competencies** that are briefly explained below.

1. **Communicating (in, with and about Mathematics)**

Communicating in, with, and about mathematical ideas involves students' sharing their mathematical understandings in oral and written forms with their classmates, teachers, and parents. This competency helps students clarify and solidify their understanding of mathematics and develop confidence in themselves as mathematics learners. It also enables teachers to better monitor student progress. Communication involves reading, decoding and interpreting statements, questions, tasks or objects. It enables the individual to form a mental model of the situation, which is an important step in understanding, clarifying and formulating a problem. During the solution process, intermediate results may need to be summarized and presented. Later on, once a solution has been found, the student may need to present the solution, and perhaps an explanation or justification, to others.

2. **Mathematising**

Mathematising involves converting a problem defined in the real world to a strictly mathematical form. This can include structuring, conceptualizing, making assumptions, and/or formulating a model or interpreting or evaluating a mathematical outcome or a mathematical model in relation to the original problem. Mathematising is used to describe the following activities:

- analyzing and critiquing foundations and properties of existing models, including assessing their range and validity;
- decoding existing models, i.e translating and interpreting models in terms of the reality model;
- performing active modelling in a given context;
- communicating about the model and its result and
- Monitoring and controlling the entire modelling process.

3**. Representation**

This can entail selecting, interpreting, translating between, and using a variety of representations to capture a situation, interact with a problem, or to present one's work. The representations referred to include graphs, tables, diagrams, pictures, equations, formulae, textual descriptions,

and concrete materials (fingers, base-ten blocks, geoboards, pattern blocks, snap cubes and algebra tiles) and other form representation such as coordinate systems.

4. **Reasoning and argument**

Mathematical reasoning and argument is the critical skill that enables a student to make use of all other mathematical skills. With the development of mathematical reasoning, students recognize that mathematics makes sense and can be understood. They learn how to evaluate situations, make inferences, check a justification that is given, draw logical conclusions, devise formal and informal mathematical arguments, develop and describe solutions, and recognize how those solutions can be applied.

5. **Devising strategies for solving problems**

Problem posing and problem solving involve examining situations that arise in mathematics and other disciplines and in common experiences, describing these situations mathematically, formulating appropriate mathematical questions, and using a variety of strategies to solve problems arising from a task or context. Through problem solving mathematical problems, students acquire ways of thinking, habits of persistence and curiosity, and confidence in unfamiliar situations that serve them well outside the mathematics classroom.

6**. Using mathematical language and operations**

Mathematical literacy requires using symbols, formal and technical language and operations. This involves understanding, interpreting, manipulating, and making use of symbolic expressions within a mathematical context (including arithmetic expressions and operations) governed by mathematical conventions and rules. It also involves understanding and utilizing formal constructs based on definitions, rules and formal systems and also using algorithms with these entities. The symbols, rules and systems used will vary according to what particular mathematical content knowledge is needed for a specific task to using mathematical tools.

7**. Using mathematical tools**

Mathematical tools encompass physical tools such as measuring instruments, as well as calculator computer-based tools and mathematical software that are becoming more widely available. This ability involves knowing about and being able to reflectively use aids and tools that may assist mathematical activity, and knowing about the limitations of such tools.

8**. Connections**

Making connections involves seeing relationships between different topics and drawing on those relationships in future study. This applies within mathematics so that students can translate readily between fractions and decimals, or between algebra and geometry; with other content areas so that students understand how mathematics is used in the sciences, the social sciences, and the arts; and with everyday situations, so that students can connect school mathematics to daily life.

THE MATHEMATICAL CONTEXTS

An important aspect of competency based assessment is that mathematics is engaged in solving a problem set in a context. The context is the aspect of an individual's world in which the problems are placed. The choice of appropriate mathematical strategies and representations is often dependent on the context in which a problem arises. The items in the book use a wide variety of contexts. This offers the possibility of connecting with the broadest possible range of individual interests and with the range of situations in which individuals operate in the 21st century.

Four context categories have been defined and are used to classify assessment items.

1. **Personal**

Problems classified in the personal context category focus on activities of one's self, one's family or one's peer group. The kinds of contexts that may be considered personal include (but are not limited to) those involving food preparation, shopping, games, personal health, personal transportation, sports, travel, and personal scheduling and personal finance.

2. **Occupational**

Problems classified in the occupational context category are centred on the world of work. Items categorized as occupational may involve (but are not limited to) such things as measuring, costing and ordering materials for building, payroll/accounting, quality control, scheduling/inventory, design/architecture, and job-related decision making.

3. **Societal**

Problems classified in the societal context category focus on one's community (whether local, national or global). They may involve (but are not limited to) such things as voting systems, public transport, government, public policies, demographics, advertising, national statistics and economics. Although individuals are involved in all of these things in a personal way, in the societal context category the focus of problems is on the community perspective.

4. **Scientific**

Problems classified in the scientific category relate to the application of mathematics to the natural world and issues and topics related to science and technology. Particular contexts might include (but are not limited to) such areas as weather or climate, ecology, medicine, space science, genetics, measurement, and the world of mathematics itself. Items that are intra mathematical, where all the elements involved belong in the world of mathematics, fall within the scientific context.

THE MATHEMATICAL CONTENT

The content categories are divided into **five major strands** as prescribed in the mathematics curriculum. These five categories characterize the range of mathematical content that is central to the discipline and illustrate the broad areas of content with learning out comes that guide development of competency based assessment test items for Class IV Teachers' reference competency based assessment book.

1. **Numbers and Operations**

   The Number and Operations Standard deals with understanding of numbers, developing meanings of operations and computational fluency. Having computational fluency allows students to make good decisions about the use of mathematical tools. Students quantify and measure objects, estimate mathematical quantities and represent and communicate ideas in the language of mathematics.

2. **Algebra(Pattern and Relationship)**

   Algebra is best learned as a set of concepts and techniques tied to the representation of quantitative relations and as a style of mathematical thinking for formalizing patterns, functions, and generalizations.t helps the students to recognize similarities between the object and the events, generalize patterns and use them to describe the physical world around us.

3. **Measurement (Length, Area, Mass, Capacity, and Time)**

   The Measurement standard includes understanding the attributes, units, systems, and processes of measurement as well as applying the techniques, tools, and formulas to determine measurements. Measurement can serve as a way to integrate the different strands of mathematics because it offers opportunities to learn about and apply other areas of mathematics such as number, geometry, functions, shape, size, position and dimensions of object and statistical ideas.

4. **Geometry**

   Geometry is a natural area of mathematics for the development of students' reasoning and justification skills.It helps students to represent and solve problems in real- world situations. Geometric modelling and spatial reasoning offer ways to interpreting and describing the physical environment.

5. **Data Management and Probability**

   The Data management and probability standard calls for students to formulate questions and collect, organize, and display relevant data. It also emphasizes learning appropriate statistical methods to analyse datainto useful knowledge, and make predictions and decisions based on data.

THE MATHEMATICAL PROFICIENCY

Competency based assessment item helps enhances and develops interwoven and interdependent mathematical proficiency in students when they solve these items- the majority of them are presented in real world contexts.

1. **Conceptual Understanding**

   Conceptual understanding refers to an integrated and functional grasp of mathematical ideas. Students with conceptual understanding know more than isolated facts and methods. They understand why a mathematical idea is important and the kinds of contexts in which is it useful. They have organized their knowledge into a coherent whole, which enables them to learn new ideas by connecting those ideas to what they already know i.e comprehension of mathematical concepts, operations, and relations. A few of the benefits of building conceptual understanding are that it supports retention, and prevents common errors.

2. **Procedural Fluency**

Procedural fluency refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently.

3. **Strategic Competence**

   Strategic competence refers to student's ability to leverage three major processes when solving the competency based tasks. They are explained as below:

   - ✓ Formulate situations mathematically. The word formulate in the mathematics refers to individuals being able to recognize and identify opportunities to use mathematics and then provide mathematical structure to a problem presented in some contextualized form.
   - ✓ Employing mathematical concepts, facts, procedures, and reasoning. The word employ in the mathematics refers to individuals being able to apply mathematical concepts, facts, procedures, and reasoning to solve mathematically-formulated problems to obtain mathematical conclusions.
   - ✓ Interpreting, applying and evaluating mathematical outcomes. The word interpret used in the mathematical literacy definition focuses on the abilities of individuals to reflect upon mathematical solutions, results, or conclusions and interpret them in the context of real-life problems.

4. **Adaptive Reasoning**

   Adaptive reasoning refers to the capacity to think logically about the relationships among concepts and situations. Such reasoning is correct and valid, stems from careful consideration of alternatives, and includes knowledge of how to justify the conclusions.

5. **Productive Disposition**

   Productive disposition refers to the tendency to see sense in mathematics, to perceive it as both useful and worthwhile, to believe that steady effort in learning mathematics pays off, and to see oneself as an effective learner and doer of mathematics—habitual inclination to see mathematics as sensible, useful, worthwhile, coupled with a belief in diligence and one's own efficacy.

UNIT 1
NUMERATION, ADDITION AND SUBTRACTION

Chapter 1Whole number place value

Learning Outcome

At the end of the lesson, a student should be able to:

1.1.1 Recognize place value of each digit up to five digit numbers

Question 1(i)
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation
Level of Thinking: Remembering

Look at the fuel consumption report of Gasa Dzongkhag in *Figure 1.1* and answer the questions that follow:

Fuel consumption in Gasa 2016	
Diesel	**37,960 L**
Petrol	**25,947 L**

Figure 1.1

What is the place value of 3 and 4 in the *Figure 1.1?*

A	ten thousands	Tens
B	thousands	Tens
C	tens	ten thousands
D	tens	hundreds

Answer: C ten thousands and tens

Question 1(ii)
Item Type: Short Answer Question
Context: Societal
Competency: Representation
Level of Thinking: Understanding
Identify the same digits in the same place value?

Answer: 9

Question 1(iii)
Item Type: Short Answer Question
Context: Societal
Competency: Representation
Level of Thinking: Understanding
Identify the same digits in the different place value?

Answer: 7

Question 2
Item Type: Multiple Choice Question
Context: Scientific
Competency: Representation & Using mathematical tools
Level of Thinking: Understanding

Sergyal typed the digits3861 in his calculator. Now he is going to type the digit 2.

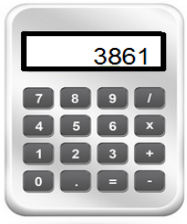


Figure 1.2

What will be the place value of 8 after typing digit 2?

A ones
B tens
C hundreds
D thousands

Answer: D thousands

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation and Communication
Level of Thinking: Understanding
Roshan wrote the number 54,911 in expanded from as shown below. What is the missing place value?
50000 + 4000 + 900+……..+ 1 = 54,911

A 4 thousands
B 9 hundreds
C 1 tens

D 1 ones

Answer: C 1 tens

Question 4
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation
Level of Thinking: Remembering

Figure 1.3

What is the place value of 1 in *Figure 1.3*?

A ones
B tens
C hundreds
D thousands

Answer: D thousands

Question 5
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation and Communication
Level of Thinking: Understanding

This is the report on potatoes used in various primary schools in the year 2016.
Which school used 2 ten thousands, 9 thousands and 4 hundreds and 2 tens potatoes?

	Name of School	Weight
A	Lhaling Primary School	39831 kg
B	Samaey Primary School	29742 kg
C	Kagtong Primary School	19600 kg
D	Karmaling Primary School	29420 kg

Figure 1.4

Answer: D Kagtong Primary School
Question 6
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation and Communication
Level of Thinking: Understanding

Dawa thinks of a four-digit number.

- The thousands digits is 3 digits times the tens digit.
- The hundreds digit is even.
- The unit's digit is an odd number less than 5.

Which of the following could be Dawa's number?
A 1,933
B 2,663
C 6,425
D 9,831
Answer: **D** 9,831

Question 7
Item Type: Long Answer Question
Context: Scientific
Competency: Representation and Mathematising
Level of Thinking: Creating
Write a number which has 3 in hundreds place and 1 in thousands place.

Sample Answer: 1300, 1301, 1302, 1311, etc.

Learning Outcome
1.1.2 Read and rename numbers in different ways using place value system

Question 1
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation
Level of Thinking: Understanding

A number is represented using base ten blocks. What number is it?

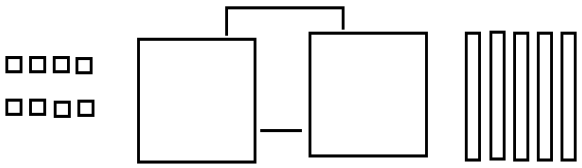


Figure 1.5

A 16
B 358
C 538
D 835

Answer: B 358

Question 2
Item Type: Multiple Choice Question
Context: Occupational
Competency: Representation and Connection
Level of Thinking: Remembering

Figure 1.6

How do we rename the number tag of runner Y in the *Figure 1.6*?

A Nine thousand seventy four
B Nine thousand seven hundred forty
C Nine thousand seventy four hundred
D Nine hundred seventy four thousand

Answer: B Nine thousand seven hundred forty

Question 3
Item Type: Multiple Choice Question
Context: Occupational
Competency: Representation
Level of Thinking: Understanding

Peljor Dorji wanted to withdraw money from the bank.

Figure 1.8

He wrote the number word incorrectly in the *Figure 1.8*. What could be the correct number word?

A Forty ten thousand five hundred twenty five.
B Four ten thousand five hundred twenty five.
C Four thousand five hundred twenty five.
D Forty five thousand twenty five.

Answer: D Forty five thousand twenty five.

Question 4
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation and Communication
Level of Thinking: Analyzing

Deki typed a 5 digit number on her smart phone. She gave her friends 3 hints to determine the number.

- The highest place, the hundreds place value, and the ones place value all have the same digit.
- The digit in the tens place value is one less than the digit in the thousands place value.
- The hundreds place value is 9 greater than the tens place.

What could be Deki's number?

A 91,909
B 99,909
C 90,919
D 91,990

Answer: A 91,909

Question 5
Item Type: Multiple Choice Question
Context: Scientific
Competency: Representation
Level of Thinking: Understanding

12,035 is the same as

A Ten thousand, two hundred, thirty five.
B Twelve thousand, thirty five.
C Twelve hundred, thirty five.
D Twelve, thirty five.

Learning Outcome
At the end of the lesson, a student should be able to:
1.1.3 Compare and order two or more whole numbers up to five digits

Question 1
Item Type: Multiple Choice Question
Context: Personal
Competency: Problem Solving, Representation and Communication
Level of Thinking: Creating

Tashi found the following cards on the road side.

Figure 1.9

He is wondering how to make the largest digit number. What could be the number?

A 80,961

B 89,610
C 98,016
D 98,610

Answer: D 98,610

Question 2
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation
Level of Thinking: Understanding

The owner of an orchard kept records about how many apples were picked in the past 4 days.

Apples picked	
Day	**Number of apples**
Monday	58,897
Tuesday	56,572
Wednesday	56,787
Thursday	58,899

Figure1.10

Arrange the days of apples picked from least to greatest?

A	Tuesday	Wednesday	Monday	Thursday
B	Monday	Tuesday	Wednesday	Thursday
C	Tuesday	Wednesday	Thursday	Monday
D	Wednesday	Thursday	Monday	Tuesday

Answer: A Tuesday, Wednesday, Monday, Thursday

Question 3
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation, Reasoning and Argument, Connection and Problem Solving
Level of Thinking: Analyzing

Choden wants to buy an old car. The table 1.11 shows the details of four cars.

Model	Year	Advertised price(Nu)	Distance travelled(Km)	Fuel capacity(Litres)
Swift	2003	480,000	10,500	34
Alto K10	2001	445,000	11,500	30
Alto 800	2006	425,000	12,800	30
Wagon R	1999	399,000	10,900	34

Figure 1.11

Choden wants a car that meets all of these conditions:

- The distance travelled is not more than 12000km.
- It was made after the year 2000.
- The price is between Nu 400,000 and Nu 450,000.

Which car meets Choden's conditions?

A Swift
B Alto K10
C Alto 800
D Wagon R

Answer: **B** Alto K10

Question 4
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation and Mathematical language and operation
Level of Thinking: Analyzing

Tashi, Tshering and Sangay placed 3 numbers on a number line, as shown in figure 1.12. Which of the following is correct?

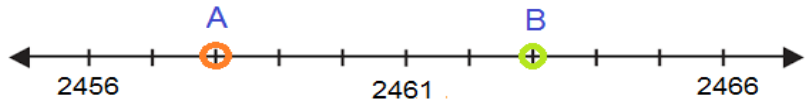


Figure 1.12

A number A is 5 greater than number B
B number A is 5 less than number B
C number B is 3 greater than number A
D number B is 5 less than number A

Answer: B number A is 5 less than number B

Question 5
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation and Mathematical language and operation
Level of Thinking: Analyzing

Four people are holding a number card each. Who is holding a number that is 1000 more than 54,327?




64,327 55,327 54,427 54,357

A B C D

Answer: B 55,327

Chapter 2 Addition and Subtraction

Learning Outcome

At the end of the lesson, a student should be able to:

1.2.1 Demonstrate strategies to add and subtract 4 digits numbers mentally

Question 1
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem solving
Level of Thinking: Applying
A video rental shop rented 3756 DVDs in one week and 4103 DVDs in second week. About how many DVDs were rented in two weeks?

A 4000 + 5000 = 9000
B 4000 + 4000 = 8000
C 4000 + 3000 = 7000
D 4000 + 2000 = 6000

Answer: B 4000 + 4000 = 8000

Question 2
Item Type: Multiple Choice Question
Context: Scientific
Competency: Representation and Problem solving
Level of Thinking: Applying

Figure 1.13 shows the relation between Roman and English Numeral.

1	5	10	50	100	500	1000
I	**V**	**X**	**L**	**C**	**D**	**M**
Example: X = 10, V = 5, and I = 1, so the Roman Numeral XVI represents 10 + 5 + 1 = 16						

Figure 1.13

Using rule shown above, what does MDL represent?
A 1650
B 1600
C 1550
D 1500

Answer: C 1550

Question 3
Item Type: Multiple Choice Question

Context: Personal
Competency: Reasoning and Argument, Problem solving and Communication
Level of Thinking: Evaluating

Figure 1.14 shows how four students calculated 4761-3423

Khandu	Prasad	Ongmit	Dawa
4761 – 3423	4761 – 3423	4761 – 3423	4761 – 3423
4000 – 3000	5000 – 3000	5000 – 4000	4000 – 4000
1000	2000	1000	0

Figure 1.14

Whose strategy would you choose to subtract mentally? Why?

Answer: Prasad, as his estimation was closed to thousands place as compared to other.

Question 4
Item Type: Multiple Choice Question
Context: Personal
Competency: Connection and Problem solving
Level of Thinking: Applying

Karma wants to find a jar that has a capacity to hold 435mL and 567mL together.

Figure 1.15

Which jar should he choose from four jars in the figure 1.15?

A Jar A
B Jar B
C Jar C

D Jar D

Answer: C Jar C

Question 5
Item Type: Multiple Choice Question
Context: Occupational
Competency: Problem solving and Reasoning and Argument
Level of Thinking: Analyzing

The cost of each flower is marked in the figure 1.16.

Figure 1.16

Suppose you want to buy flower **A** and flower **C**, how many Nu 500 notes would you pay to shopkeeper.

A 4 notes
B 3 notes
C 2 notes
D 1 notes

Answer: **B** 3 notes

Question 6
Item Type: Short Answer Question
Context: Scientific
Competency: Representation and Mathematising
Level of Thinking: Analyzing
Write a number which is 200 more than 6,421.

Answer: 6621

Learning Outcome
At the end of the lesson, a student should be able to:
1.2.2 Estimate sums and differences of whole numbers up to 5 digits

Question 1
Item Type: Short Answer Question
Context: Personal
Competency: Representation and Reasoning and Argument
Level of Thinking: Understanding/Applying/Evaluating

The *Figure 1.17* shows the number of basketball players in India.

Basketball players		Number of players
Boys	Group A	48,544
	Group B	50,133
Girls	Group A	39,552
	Group B	20,811

Figure 1.17

1. Estimate how many more basketball players are boys than girls?
2. Calculate how many more basketball players are boys than girls?
3. Justify your choice of estimation.

Answer:

Estimate		Actual answer	
Boys	49,000+50,000=99,000	Boys	48,544+50,133=98,677
Girls	40,000+21,000=61,000	Girls	39,552+20,811=60,363

Difference 99,000 – 61,000 =38,000 Difference 98,677-60,363=38,314

I rounded the number of players to the nearest thousand before adding. My answer of 78,000 was very close to the actual answer of 77,866.

Question 2
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem solving and Reasoning and argument
Level of Thinking: Analyzing

The Figure 1.18 shows the mass of the five domestic animals.

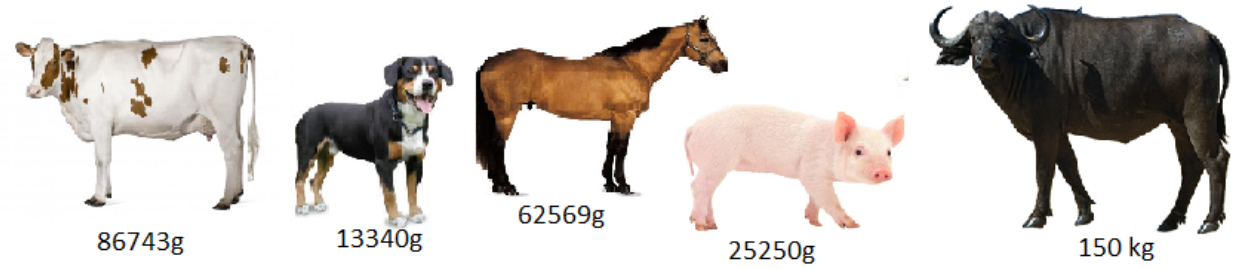


Figure 1.18

Which two animals would you choose to make the mass almost equal to buffalo?

A	dog	Horse
B	cow	Pig
C	cow	Horse
D	horse	Pig

Answer: C cow and horse

Question 3
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem Solving
Level of Thinking: Applying

Jamtsho's class collected 26,263 plastic bottles during summer vacation. In order to reach their target of 55,000, how many more plastic bottles do they need to collect?

A 28,737 bottles
B 31,263 bottles
C 32,737 bottles
D 29,763 bottles

Answer: A 28,737 bottles

Question 6
Item Type: Multiple Choice Question
Context: Societal
Competency: Communication and Reasoning and argument
Level of Thinking: Analysing

Sithar has to pay Nu 35,455 to Shyam and Shyam has to pay Nu 35,535 to Sithar. Which statement below means the same thing?
A Sithar has to pay Nu 120 to Shyam
B Sithar has to pay Nu 180 to Shyam
C Shyam has to pay Nu 120 to Sithar
D Shyam has to pay Nu 180 to Sithar
Answer: D Shyam has to pay Nu 180 to Sithar

Learning Outcome
At the end of the lesson, a student should be able to:
1.2.3 Add and subtract 5-digit numbers using different strategies

Question 1
Item Type: Multiple Choice Question
Context: Occupational
Competency: Representation and Problem solving
Level of Thinking: Understanding
In *Figure 1.19* the scale is to be balanced.

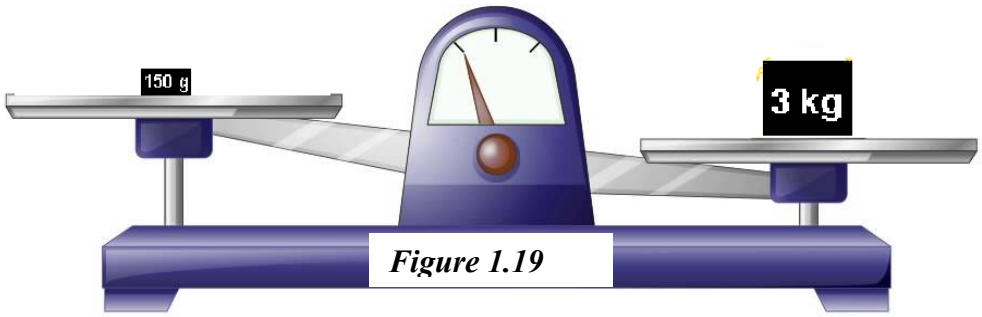


Figure 1.19

How many grams do you need to put more on the left side to balance the scale?

A 3,150g
B 3,000g
C 2,850g
D 2,500g

Answer: C 2,850g

Question 2
Item Type: Multiple Choice Question
Context: Personal
Competency: Problem Solving
Level of Thinking: Applying

Six months ago, Ugyen's weight was 78,250 grams. He went on a diet and after six months his weight was 72kilograms.How many grams did he lose?

A 7,200 grams
B 6,250 grams
C 6,000 grams
D 250 grams

Answer: A 6,250 grams

Question 3
Item Type: Multiple Choice Question
Context: Societal
Competency: Connection and Problem solving
Level of Thinking: Understanding

In the Figure1.20 there are 15,768 people watching the game and 34,890 seats are empty.

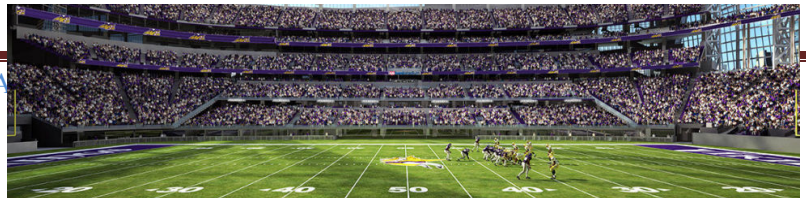


Figure 1.20

What is the total number of seats in the stadium?

A 50,658
B 50,558
C 49,558
D 40,658

Answer: A 50,658
Question 4
Item Type: Long Answer Question
Context: Occupational
Competency: Problem solving, Communication and Mathematising
Level of Thinking: Applying

Ms Wangmo's bakery bakes lots of buns. On Monday, she baked 65,750buns. On Tuesday, she baked 20,250buns. How many buns did Ms Wangmo bake in two days?
Answer:

1. 20,250 + 65,750

= 20,000+ (250+65,750)
= 20,000+ 66,000= 86,000

2.
$$\begin{array}{r} 65{,}750 \\ +\ 20{,}250 \\ \hline 86{,}000 \end{array}$$

Question 5
Item Type: Short answer question
Context: Societal
Competency: Problem solving, Representation and Communication
Level of Thinking: Applying

The *Figure1.20* shows population of four dzongkhags.

Figure1.20

Answer the following questions:

1. Which dzongkhags has the largest population?
2. What is the difference between the population of Samtse and Bumthang?
3. Find the total population of four dzongkhags listed in the figure?

Question 6
Item Type: Short Answer Question
Context: Personal
Competency: Mathematising and Reasoning and Argument
Level of Thinking: Evaluating

Choki solved the addition problem in two different ways as shown below.
48,750+32,250

1. **Regrouping**

Ten thousands	Thousands	Hundreds	Tens	Ones
4	8	7	5	0
3	2	2	5	0
7	10	9	10	0
7+1=8	0	9+1=10	0	0

8	1	0	0	0

2. Add in parts

48,750+32,250
= 48,750+**30000**+2000+200+50
= 78,750+**2000**+200+50
= 98,750+**200**+50
= 98,950+**50**
= 99,000

Which strategies do you think is the correct? Explain your thinking?

Answer:

1. 48,750+32,250
   =48,750+**30000**+2000+200+50
   =78,750+**2000**+200+50
   =80,750+**200**+50
   =80,950+**50**
   =81,000

First strategy is correct because the regrouping and addition is correct.
The second strategy is wrong because 78,750 + 2,000 is not equal to 98950

Question 7
Item Type: Short Answer Question
Context: Societal
Competency: Problem solving and Communication
Level of Thinking: Applying / Analyzing

Dema is at Beads shop to buy some beads. The shop owner showed her the price list.

Beads	Price (Nu)
Round bead	22,176
Oval bead	32,812
Long bead	55,189
Brown cat's eye bead	90,000

1. How much money does she need to buy round bead and long bead?
2. If she has Nu 65,500 would it be enough to buy a brown cat's eye bead? Why?

Answer:

22,176 + 55,189 =77,365
No, the amount she has is less than the cost of brown cat's eye bead.

Question 8
Item Type: Short Answer Question
Context: Personal
Competency: Problem solving and Communication
Level of Thinking: Applying

Lam Karma Dorji drove 27,685 km of a 72,000km journey. Use any method to calculate the remaining journey of Lam Karma.

Answer

1. Regrouping
2. Using number line
3. Subtracting in parts

UNIT 2
MULTIPLICATION AND DIVISION FACTS

Chapter 1 MULTIPLICATION

Learning Outcome
At the end of the lesson, a student should be able to:
2.1.1 Multiply numbers using different strategies (skip counting, arrays and halving and doubling)

Question 1
Item Type: Multiple Choice Question
Context: Scientific
Competency: Problem solving and Mathematising
Level of Thinking: Applying

Octopus is a sea animal having four pairs of legs as shown in *figure 2.1.* How many legs will seven Octopuses have?

Figure 2.1

A 14
B 28
C 42
D 56

Answer: D 56

Question 2
Item Type: Multiple Choice Question
Context: Scientific
Competency: Problem solving and Mathematising.
Level of Thinking: Applying

A frog makes 6 jumps over the leaves in water. In each jump it covers 3 big leaves. How many big leaves does it cover altogether?

A 3
B 6
C 9
D 18

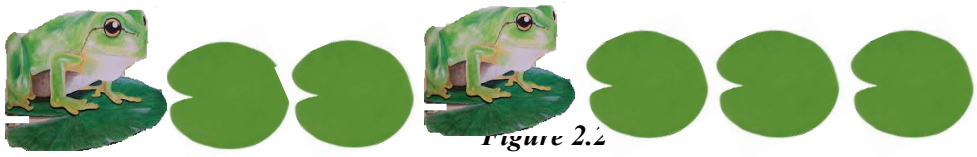


Figure 2.2

Answer: D 18

Question 3
Item Type: Multiple Choice Question
Context: Occupational
Competency: Representation and Connections
Level of Thinking: Understanding

Dorji designed the window frames in this array. Which multiplication fact matches his design?

Figure 2.3

A 8 × 2
B 2 × 8
C 16 ×1
D 1 ×16

Answer: B 2 × 8

Question 4
Item Type: Short Answer Question
Context: Personal
Competency: Representation
Level of Thinking: Remembering

Sunil went to a grocery shop to buy things. He was interested to see the things arranged in arrays.

A **B** **C** **D**

Figure 2.4

Complete the table with correct multiplication fact from the arrays above.

A	B	C	D

Solutions:

A	B	C	D
3 × 4	4 × 4	4 × 6	3 × 5

Question 5
Item Type: Long Answer Question
Context: Personal
Competency: Reasoning and argument and Communication
Level of Thinking: Evaluation/Creating

Look at the calendar and answer the questions that follow.

January 2017

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Figure 2.5

i) Phurba looked at the calendar above and said that it is an array. Do you agree with him? Explain your Thinking?

Answer: No, Phurba is not correct because four numbers are missing in the last row.

ii) Create any two arrays from the calendar for each?

a) 4 × 2
b) 2 × 6

Answer:

a) Sample Response:

3	4
10	11
17	18
24	25

b) Sample Response:

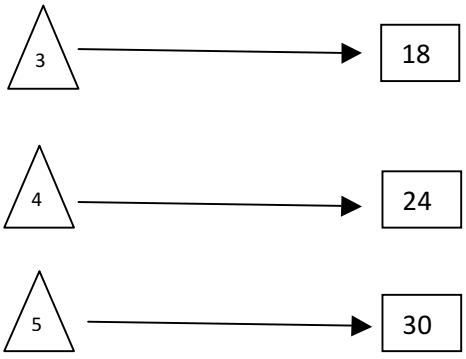
15	16	17	18	19	20
22	23	24	25	26	27

Question 6
Item Type: Short Answer Question
Context: Personal
Competency: Communication and Problem solving
Level of Thinking: Applying

Pema baked 7 trays of cookies. Each tray has 20 cookies. How many cookies did he bake in all?

Solution: 7 × 20
7 × 10 =70 (10 is half of 20)
70 + 70= 140(double the product)
Therefore Pema baked 140 cookies**.**
OR
7 x 20
= 7 x 2 x 10
= 14 x 10
= 140
Therefore, Pema baked 140 cookies.

Question 7
Item Type: Multiple Choice Question
Context: Personal
Competency: Reasoning and argument and Connections
Level of Thinking: Analyzing



Sonam used a strategy to get a number in the ☐.Which one is correct?

A Half of Δ multiply by double of 6
B Double of Δ multiply by half of 6

C Half of Δ multiply by double of 8
D Double of Δ multiply by half of 8

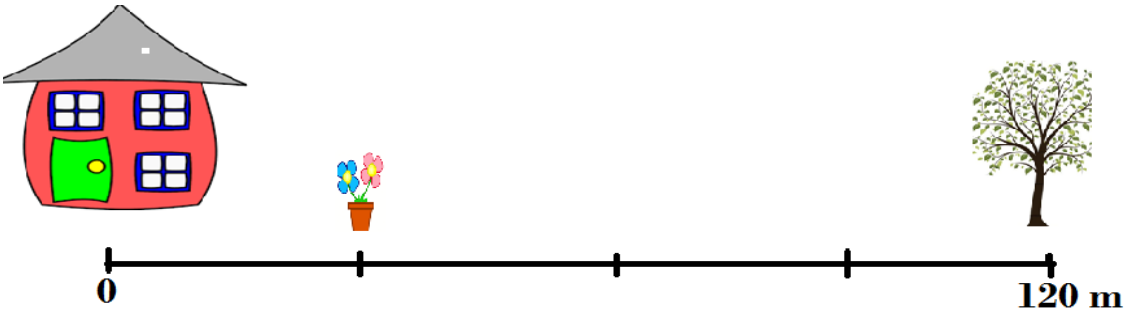
Answer: B Double of Δ multiply by half of 6

Question 8
Item Type: Long Answer Question
Context: Societal
Competency: Problem solving
Level of Thinking: Applying

Six teachers of Gomdar Central School have a four wheeler car each. How many wheels are there altogether?

Learńing Outcome
At the end of the lesson, a student should be able to:
2.1.2 Demonstrate an understanding of various meanings of multiplication

Question 1
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem solving and Communication
Level of Thinking: Analysing



In the figure 2.6 the tree is four times the distance from the house to the flower pot.

Figure 2.6

What is the distance from the house to the flower pot?

A 20 m
B 30 m
C 40 m
D 50m
Answer: B 30 m

Question 2
Item Type: Short Answer
Context: Societal
Competency: Problem solving, Connections and Communication
Level of Thinking: Applying

Figure 2.7 shows the picture of a rectangular children's park. What is the area of the park in square units?

7 units

4 units

Figure 2.7

Solution: Length = 7 units
Width = 4 units
Therefore the area of the park = l×w
= 7 units × 4 units
= 28 square units

Question 3
Item Type: Multiple Choice Question
Context: Personal

Competency: Connections and Mathematising
Level of Thinking: Applying

A box contains two bags of apples, each bag holds 14 apples. If you have 4 boxes of apples, how many apples do you have altogether?

A 28
B 56
C 112
D 224
Answer: D 112

Question 4
Item Type: Multiple Choice Question
Context: Personal
Competency: Reasoning and argument, Representation and using symbols
Level of Thinking: Understanding /Analyzing

The pictograph below shows how many strawberries three students picked.

Ram	
Dorji	
Tandin	
One  **means 4 strawberries**	

a) How many strawberries did they pick altogether?
b) How many more strawberries did Ram pick than Dorji?

Solution:

a) Hint1 strawberry = 4 strawberries
Total Strawberries in the graph = 8
Total strawberries = 4 ×8 =32

Therefore altogether they picked 32 Strawberries.

b) Ram picked 12 strawberries and Dorji picked 8 strawberries. Therefore, Ram picked 4 more strawberries than Dorji.

Question 5
Item Type: Short Answer Question
Context: Occupational
Competency: Problem solving and Mathematising
Level of Thinking: Understanding / Applying

Ap Norbu's poultry farm sells eggs in trays and in cartoons. One tray of eggs cost Nu 230 and there are seven trays in a cartoon.

Fig 2.8

i) How many eggs are there in a cartoon?
Answer: 1 tray has 30 eggs, so 7 trays, 7 × 30 =210 eggs

ii) What is the cost for a cartoon of eggs?
Answer: 1 tray cost Nu 230,
So 7 trays cost = 7 × 230 = Nu 1610

Question 6
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation and Using symbols
Level of Thinking: Understanding
In a classroom, tables are arranged in the array as shown in *Figure 2.9.* What is the number of rows and columns?

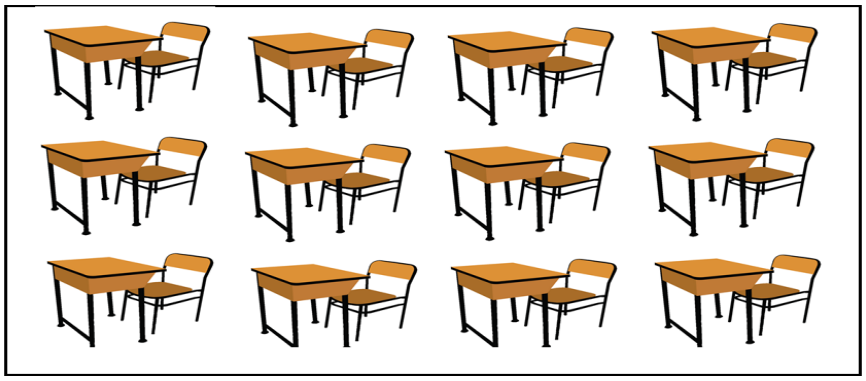


Fig 2.9

	Rows	Columns
A	5	4
B	4	5
C	4	3
D	3	4

Answer: D

Question 7
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation and Mathematising
Level of Thinking: Applying

Which statement represents 45 = 5 X 9?

A Dema collected 45 barbie dolls and gave 9 away.
B Dema collected 5 barbie dolls every month for 9 months.
C Dema collected 5 barbie dolls for one month and 9 toy cars for the second month.
D Dema had collected 5 barbie dolls and increased the number of dolls by 45.

Answer: B Dema collected 5 barbie dolls every month for 9 months**.**

Learning Outcome
At the end of the lesson, a student should be able to:
2.1.3 Demonstrate an understanding of commutative, associative and distributive property of multiplication (multiplication table patterns)

Question1

Item Type: Multiple Choice Question
Context: Occupational
Competency: Communication and Representation
Level of Thinking: Applying

Tashi sold eight bunches of litchis with each bunchas shown in *Figure 2.10*.

Fig 2.10

How many litchis did he sell in all?

A 35
B 40
C 45
D 50
Answer: B 40

Question 2
Item Type: Multiple Choice Question
Context: Personal
Competency: Reasoning and argument and Communication
Level of Thinking: Analyzing
Nisha knows the multiplication table up to 6. She wants to multiply 8 x 7. Which is the easiest way to help her multiply?

A $7 \times 2 \times 2 \times 2$
B $8 \times 1 \times 7$
C $7 \times (5 + 3)$
D $8 \times (8 - 1)$
Answer: A $7 \times 2 \times 2 \times 2$

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Problem solving and communication
Level of Thinking: Understanding

Rinzin takes 4 minutes to polish a pair of shoes. How would Rinzin find out how many minutes would he take to polish 8 pairs of shoe?

A Add 4 and 8
B Subtract 4 from 8
C Multiply 4 and 8
D Divide 8 by 4

Answer: C Multiply 4 and 8

Figure 2.11

Question 4
Item Type: Multiple Choice Question
Context: Personal
Competency: Using mathematical tools and Representation
Level of Thinking: Understanding

The screen dimensions of a smart phone are shown in fig 2.12. Find the area of the screen.

A 35 square cm
B 40 Square m
C 45 square cm
D 45 Square m

Answer: C 45 square cm

Figure 2.12

Question 5
Item Type: Short Answer Question
Context: Personal
Competency: Problem Solving
Level of Thinking: Applying

Sangay used a strategy 9 = (10 – 1) to multiply 8 × 9 as shown in the example below.

8 × 9
= 8 × (10 – 1)
= 8 × 10 – 8 × 1 = 80 – 8 = 72.
Therefore, 8 × 9 = 72.
Use Sangay's strategy to multiply each.

i) 6 × 9

Solution:

6 x 9 = 6 x (10-1)
= 6 x 10 – 6 x 1
= 60 - 6 = 54

ii) 4 × 9

Solution:

4 × 9 = 4 x (10 -1)
= 4 x 10 – 4 x 1
= 40 – 4 = 36

Question 6
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation and Mathematical language and operation
Level of Thinking: Understanding

Tashi bought 3 packets of red marbles and 5 packets of green marbles, each packet is shown in the *Figure 2.13*.

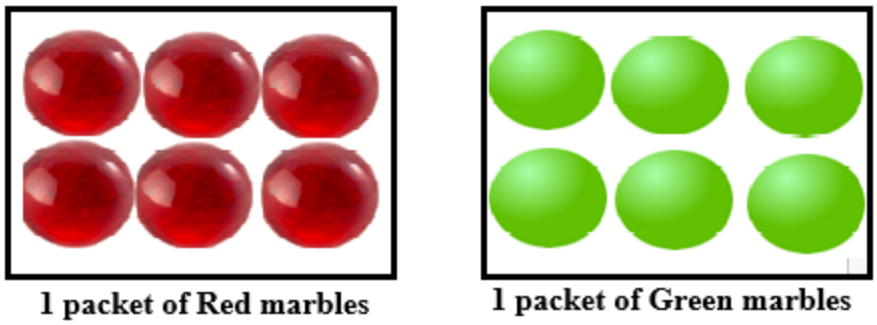


Fig 2.13

Which number sentence represents the above statement?

A 3 × (5 + 6)
B 5 × (3 + 6)
C 6 × (3 + 5)
D 6 × (3 × 5)

Answer: C $6 \times (3 + 5)$

Question 10
Item Type: Multiple Choice Question
Context: Personal
Competency: Communication and Mathematising
Level of Thinking: Understanding

Cheki bought 4 packets of red chewing gum and 7 packets of green chewing gum. Each packet of chewing gum had 12 pieces in it. Which expression could Cheki use to find the total number of chewing gums she bought?

A $(12 \times 4) + 7 =$
B $(7 \times 4) + 12 =$
C $12 \times (7 + 4) =$
D $12 + (7 \times 4) =$

Answer: C $12 \times (7+4) =$

Question 11
Item Type: Multiple Choice Question
Context: Societal
Competency: Mathematising and Problem solving
Level of Thinking: Applying

A year has 365 days, and one day has 24 hours. How many hours are there in 365 days?

A 2190 hours
B 7440 hours
C 7679 hours
D 8760 hours

Answer: D 8760 hours

CHAPTER 2 DIVISION

Learning Outcome

2.2.1 Demonstrate an understanding of various meanings of division (sharing and grouping)

Question 1
Item Type: Multiple Choice Question
Context: Occupational
Competency: Communication
Level of Thinking: Applying

Phuntsho needs 35 litres of paint to paint the wall. How many tins should he buy if the paint comes in the tin as shown in *Figure 2.14?*

A 5 tins
B 7 tins
C 9tins
D 11 tins

Answer: B 7 tins

Figure 2.14

Question 2
Item Type: Multiple Choice Question
Context: Personal
Competency: Reasoning and argument and Communication
Level of Thinking: Analyzing

When 10 balls are dropped into the machine as shown in the *Figure 2.15*, it comes out as 5.
When 16 are dropped in, it comes out as 8.
What number will come out if 8 balls are dropped?

A 3
B 4
C 5
D 6

Answer: B 4

Fig 2.15

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Communication
Level of Thinking: Analyzing

Amir's father bought 24 numbers of socks for his family members. He gave two pairs to each of them. How many members were there in his family?

A 4 members
B 6 members
C 8members
D 10 members

Answer: B 6 members

Question 4
Context: Occupational
Competency: Communication
Level of Thinking: Applying

Dawa needs 48 bulbs to fix in the school auditorium. The bulb comes in packages as shown in figure 2.17.

Figure 2.17

How many packages should he buy?

A 6
B 7
C 8
D 9

Answer: A 6

Question 5
Item Type: Multiple Choice Question
Context: Societal

Competency: Communication
Level of Thinking: Applying

A mother shared 35 slices of cakes among her children. Each child got the share as shown in the *Figure 2.18*. How many children does she have?

Fig 2.18

A 5
B 6
C 7
D 9

Answer: C 7

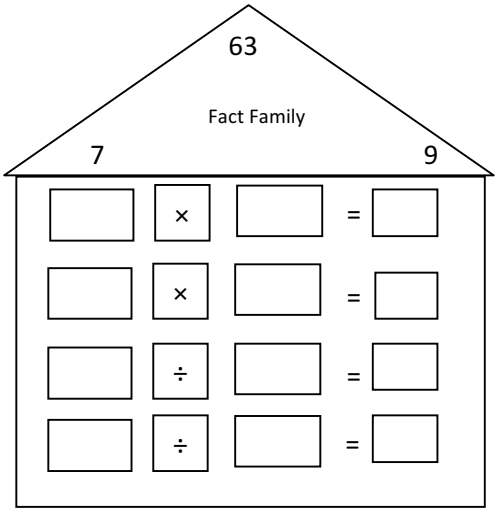
Question 6
Item Type: Long Answer Question
Context: Societal
Competency: Communication and Problem solving
Level of Thinking: Understanding

A basket of oranges are shared equally among 9 students. How many oranges might there have been if there are no oranges left over.
Answer: multiples of nine

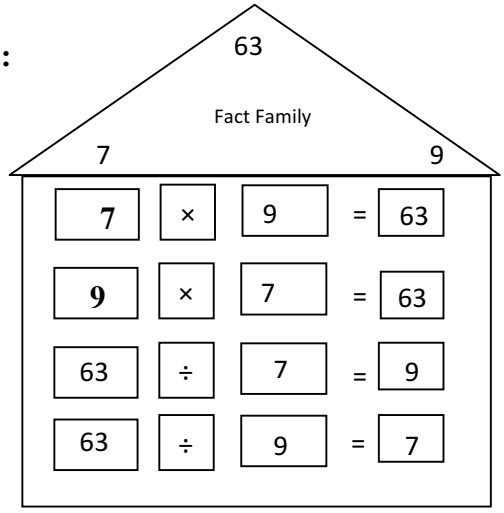
Learning Outcome
At the end of the lesson, a student should be able to:
2.2.2 Relate multiplication and division facts using principles of these operations

Question 1
Item Type: Short Answer Question

Context: Personal
Competency: Using Operations
Level of Thinking: Remembering
Write multiplication and division fact family in the box given below.



Solution:



Question 2
Item Type: Short Answer Question
Context: Personal
Competency: Communication
Level of Thinking: Understanding

Answer the questions based on the *Figure 2.19*.

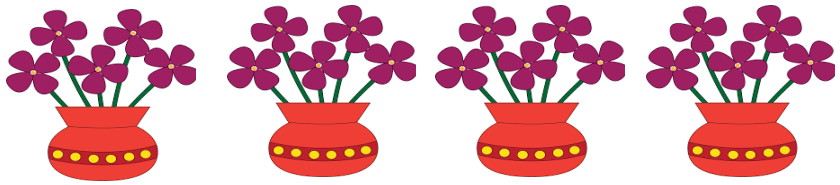


Fig 2.19

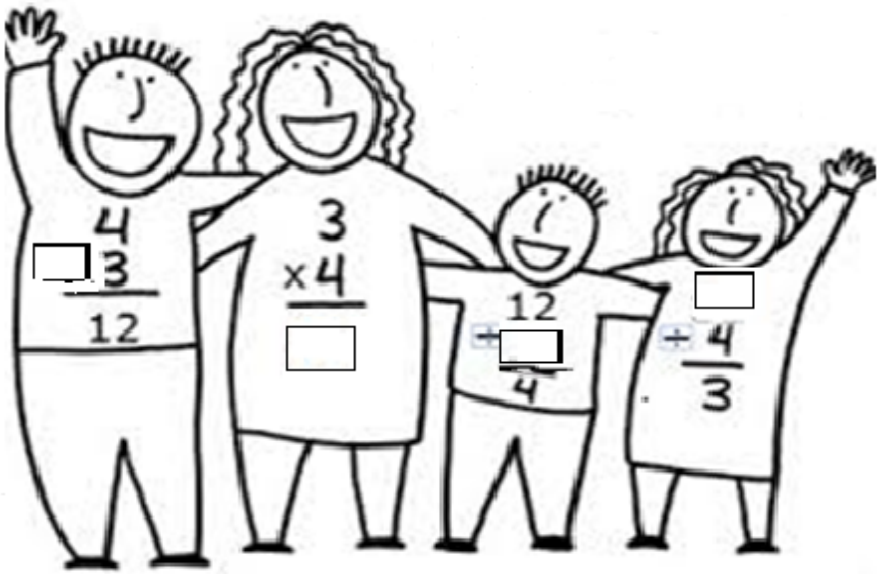
i) Write all the division and multiplication facts family for given figure.
Answer: Division, $20 \div 4 = 5$ and $20 \div 5 = 4$
Multiplication, $4 \times 5 = 20$ and $5 \times 4 = 20$

ii) How many flowers petals are there in all?
Answer: 1 flower has 4 petals, as there are 20 flowers
So $4 \times 20 = 80$ petals.

Question 3
Item Type: Multiple Choice Question

Context: Societal
Competency: Using Operations
Level of Thinking: Analyzing

Choose the correct sequence of numbers and operations from the following for this family**.**



A	**12**	÷	**3**	×
B	÷	**12**	×	**3**
C	**12**	**3**	×	**12**
D	×	**12**	**3**	**12**

Answer: D

×	**12**	**3**	**12**

Question 4
Item Type: Short Answer Question
Context: Personal
Competency: Using Operations
Level of Thinking: Applying

Look at this diagram below. One of the number sentences we can create is 15 ÷ 5 =3. Create two possible number sentences from this array.

Figure 2.20

Solutions: 15 ÷ 3 = 5
5 × 3 =15 or
3 × 5 = 15

Question 5
Item Type: Long Answer Question
Context: Occupational
Competency: Reasoning and argument, Communication and Problem solving
Level of Thinking: Applying /Analyzing

80 workers have to cross Punatsangchu, using the boats. Both boats charge Nu 96 per trip.

Boat A carries 8 people

Boat B carries 5 people

i) How many trips can boat A make?

Solution: 80 ÷ 8 = **10 trips**

ii) How much the workers have to pay, if they choose to travel by boat B?

Solution:

80 ÷ 5 = 16 trips

16× 95 = **Nu 1250**

iii) As a boats man, which boat will give you better earning?

Solution:

Boat A: 10 × 95 = Nu 950

Boat B: 16 × 95 = Nu 1250

Therefore, Boat B will give better earning.

Learning Outcome

At the end of the lesson, a student should be able to:

2.2.3 Demonstrate an understanding of multiplication and division any number by zero and 1, respectively

Question 1
Item Type: Short Answer Question
Context: Personal
Competency: Reasoning and argument and Communication
Level of Thinking: Evaluating

Lhadon has solved the following division and multiplication problems. Do you agree with her?

Lhadon's work		Agree / Not Agree	Justify
A	9 × 0 = 9		
B	9 ÷ 1 = 1		
C	7 × 1 = 7		
D	8 ÷ 0 = 0		

Justify your answer.

Question 2
Item Type: Short Answer Question
Context: Personal
Competency: Reasoning and argument and Connections
Level of Thinking: Analyzing

Pema enjoys multiplying a number by 0 and 1. What could be the reason? Give an example each?

Solution: It is easy to multiply any number by 0 because any number times 0 is equal to 0 and any number times 1 is the number itself.

Sample Example:

i) 7 × 0 = 0 (0+0+0+0+0+0+0=0)

ii) 0 × 9 = 0 (0 + 0 +0+0+0+0+0+0+0)

iii) 23 × 1= 23

iv) $1 \times 99 = 99$.

UNIT 3
MEASUREMENT

Chapter 1 Length and Area

Learning Outcome

At the end of the lesson, a student should be able to:

3.1.1 Estimate and measure length in millimeters, centimeters, decimeters, meters and kilometers

Question 1

Item Type: Multiple Choice Question
Context: Personal
Competency: Connections
Level of Thinking: Applying

Which of the following is about one millimetre?

			
Width of a note	Thickness of a spoon	Diameter of a coin	Length of a pencil

Figure 3.1

A Width of a note
B Thickness of a spoon
C Diameter of a coin
D Length of a pencil

Answer: B Thickness of a spoon

Question 2

Item Type: Multiple Choice Question
Context: Societal
Competency: Reasoning and Argument

Level of Thinking: Analyzing

Write these weights in order, starting with the largest first.




12000 g 1000 kg 1000 g 2500 kg

Figure 3.2

A	dog	elephant	rat	dinosaur
B	rat	dog	elephant	dinosaur
C	dinosaur	elephant	dog	rat
D	elephant	rat	dinosaur	dog

C dinosaur Elephant dog rat

Answer:

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Problem solving
Level of Thinking: Applying

There is an empty space with 2.5 m length. Rigden placed a table in the empty space which is 17 dm long. What part of the space is not covered?

A 8 m
B 8 dm
C 14.5 m
D 14.5 dm

Answer: B 8 dm

Question 4
Item Type: Multiple Choice Question
Context: Scientific
Competency: Using mathematical tools and representation
Level of Thinking: Applying
Yasel placed the pencil on the ruler to measure its length.

What is the length of the pencil?

A 4 cm
B 10 cm
C 12 cm
D 14 cm

Answer: B 10 cm

Question 5
Item Type: Short Answer Question
Context: Personal
Competency: Connection and Problem solving
Level of Thinking: Applying

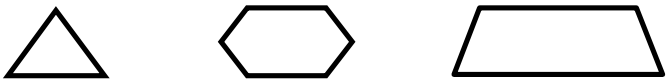
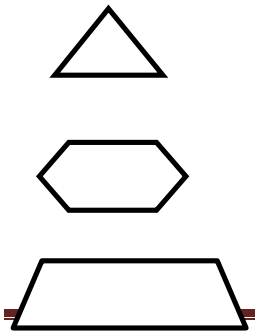


Figure 3.4

Look at Figure 3.4 and measure around each shape with a string; draw a line that is just as long as the distance around the shape.



Learning Outcome
At the end of the lesson, a student should be able to:
3.1.2 Estimate and measure areas of regular shapes

Question 1
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem solving and Mathematising
Level of Thinking: Applying

The white area around the pool in the in the Figure 3.5 is called the deck or walkway. Find the area of the deck around this pool.

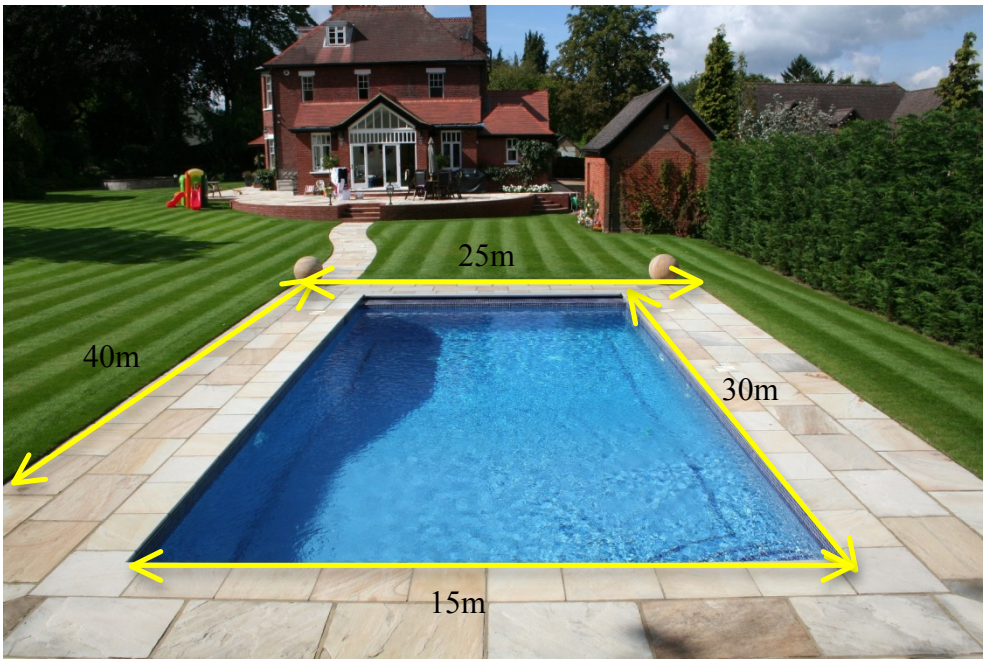


Figure 3.5

A 450 m^2
B 550 m^2
C 750 m^2
D 1000 m^2

Answer: B 550 m^2

Area of the walkway and pool
=40m × 25m= 1000 m^2

Area of pool
=30m × 15m
=450 m^2

Area of walkway
1000 m^2 – 450 m^2=550 m^2

Question 2
Item Type: Short Answer Question
Context: Personal
Competency: Reasoning and Argument and Problem solving
Level of Thinking: Analysing

Figure 3.6 shows the dimensions of Nangsel's and Lhatsho's bedroom.

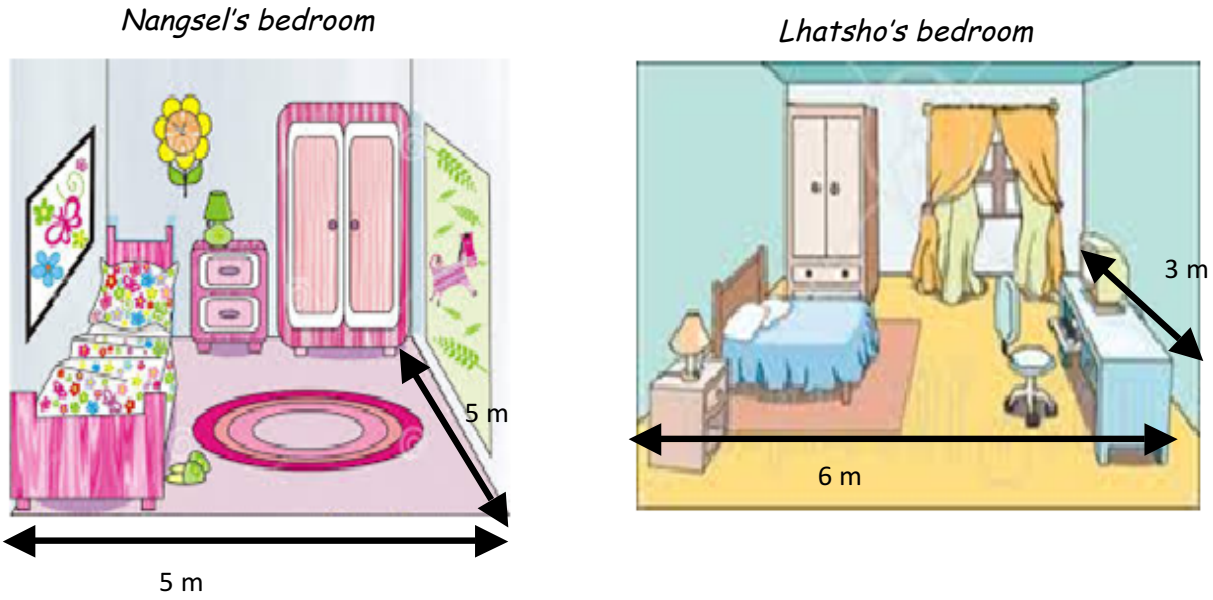


Figure 3.6

Who has the bigger bedroom and by how much? How do you know?

Answer:

Area of Lhatsho's bedroom: 3 m × 6m
= 18 m^2

Area of Nangsel's bedroom: 5 m × 5 m
= 25 m^2

Nangsel's bedroom is bigger by 7 m^2

Question 3
Item Type: Short Answer Question
Context: Personal
Competency: Representation, Communication and Problem solving
Level of Thinking: Creating

The teacher assigned the students to come up with 3 different rectangular flower beds as a class project, with equal area of 40 m^2. What could be the dimensions of the flower beds?

Sample answer: 4 m× 10 m = 40 m^2
1 m × 40 m = 40 m^2
8 m × 5 m = 40 m^2

Question 4
Item Type: Multiple Choice Question
Context: Societal
Competency: Connection
Level of Thinking: Remembering
Chimi wrote the area of Bhutan as 38,394. What is the correct unit?

A mm^2
B cm^2
C m^2
D km^2

Answer: D km^2

Question 5
Item Type: Short Answer Question
Context: Occupational
Competency: Representation, Connection and Problem solving
Level of Thinking: Understanding
Which of the following is likely to be true?

i. The area of a leaf of a banana plant is about 100 cm^2
ii. The area of the palm of a baby is about 9 cm^2
iii. The area of mathematics text book is about 2000 cm^2

Answer: false, true, false

Question 6
Item Type: Short Answer Question
Context: Occupational
Competency: Representation
Level of Thinking: Applying /Analysing

In *figure 3.7*, the shaded portion represents area of a vegetable garden owned by Mr. Phuntsho.

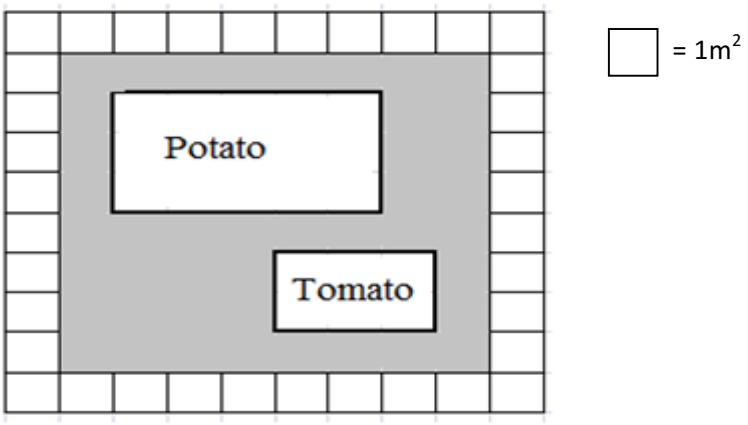


Figure 3.7

a) How much area does the potato cover?
b) How much area does the tomato cover?
c) What is the total area used for vegetables?
d) How much less area is covered by the tomato than potato? How do you know?
e) How much area is not used?

Answers:
a) 15 m^2
b) 6 m^2
c) 21 m^2
d) 9 m^2
e) 43 m^2

Learning Outcome
At the end of the lesson, a student should be able to:
3.1.3 Relate perimeter and area of shapes

Question 1
Item Type: Multiple Choice Question
Context: Personal
Competency: Communication
Level of Thinking: Applying

Rabsel wants to build a fence in his backyard for his dog. He plans to make one side 8 m wide and another side 17 m long. What could be the least amount of materials required to fence a garden? How much space is there for the dog?

Figure 3.8

A 25 m and 50 m^2
B 25 m^2 and 50 m
C 50 m and 136 m^2
D 50 m^2 and 136 m

Answer: C 50 m and 136 m^2

Question 2
Item type: Multiple Choice Question
Context: Societal
Competency: Connection and Reprsentation
Level of Thinking: Understanding

All the four flower beds are of the same area.If Dawa builds fence around the flower beds, which one will have the longest fence?

I

II

III

IV

Figure 3.9

A I
B II
C III
D IV

Answer: C III

Question 3
Item Type: Multiple Choice Question
Context: Scientific
Competency: Problem solving and Representation
Level of Thinking: Applying

The rectangle on the left and the square on the right have the same perimeter. What is the length of one side of the square?

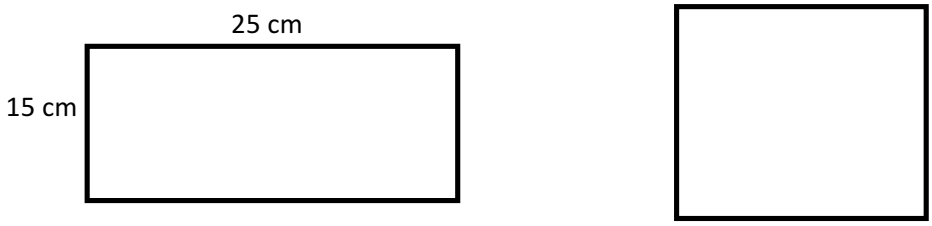


Figure 3.10

A 25 cm
B 20 cm
C 15 cm
D 10 cm

Answer: B 20 cm

Question 4
Item Type: Extended Response Question
Context: Societal
Competency: Problem solving, Reasoning and argument and Communication
Level of Thinking: Evaluating

The distance around each of the structure given in *Figure 3.11* is 86 m. Which structure do you think will occupy the maximum space? Explain?

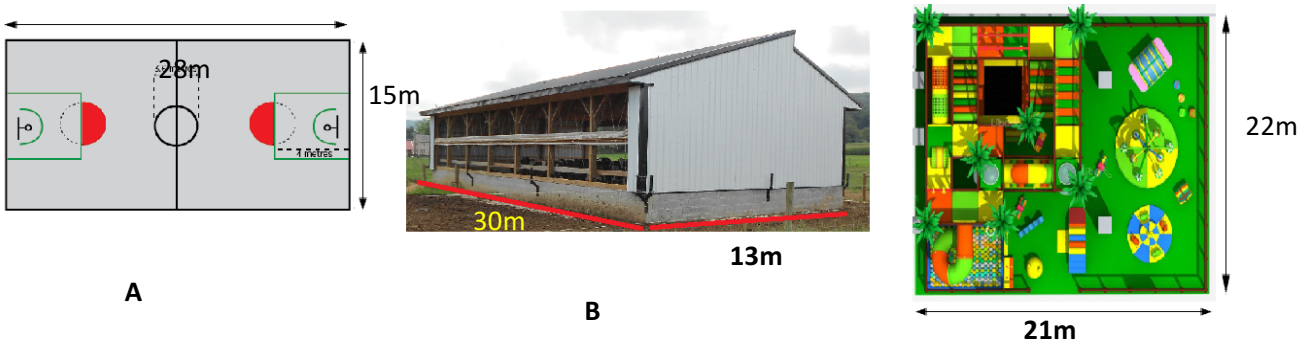


Figure 3.11

Answer:

Area of A =	Area of B=	Area of C
= 28 m × 15 m	30 m × 13 m	= 22 m × 21 m
= 420 m^2	= 390 m^2	= 462 m^2

Structure C will occupy maximum space because it has area maximum area.

Question 5
Item Type: Short Answer Question
Context: Societal
Competency: Representation, Problem solving and Mathematising
Level of Thinking: Applying/Creating

This is a map for marathon race.

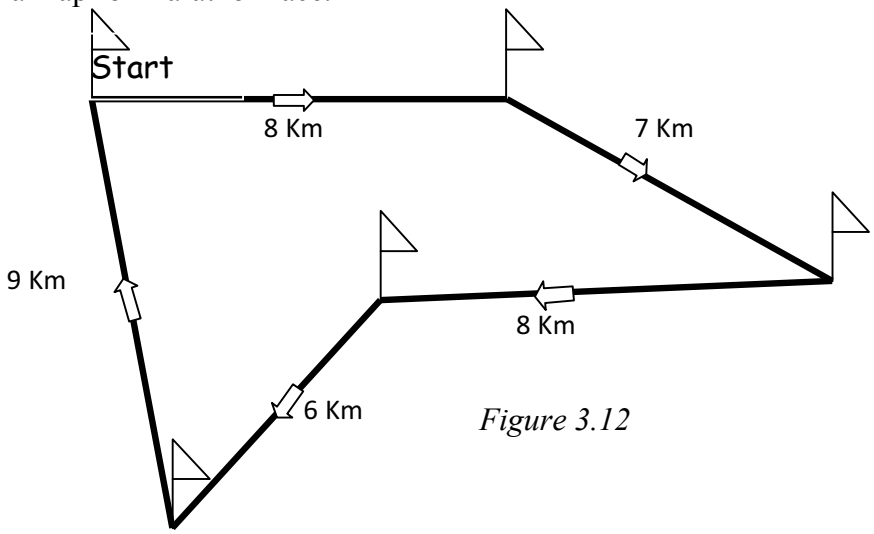


Figure 3.12

i. There were 5 points where runners are provided with water. What is the total distance a runner has to cover to complete the race?

Answer: Distance covered = the Perimeter of the shape

= 8 km + 7 km + 8 km + 6 km+ 9 km = 38 km

ii. Design a different marathon field for the same distance?

Answer: open ended

Question 6
Item Type: Multiple Choice Question
Context: Scientific
Competency: Reasoning and argument and Communication
Level of Thinking: Analysing

Which statement about the figures is true?

A Both rectangles have the same area.
B Both rectangles have the same width.
C Both rectangles have the same length.
D Both rectangles have the same perimeter.
Answer: A Both rectangles have the same area.

Question 7
Learning Outcome : 3.1.3 relate perimeter and area of shapes.
Item Type: Multiple Choice Question
Context: Scientific
Competency: Reasoning and argument and Communication
Level of Thinking: Analysing

Which statement about the figures is true?
A Both rectangles have the same area.
B Both rectangles have the same width.
C Both rectangles have the same length.
D Both rectangles have the same perimeter.
Answer: A Both rectangles have the same area.

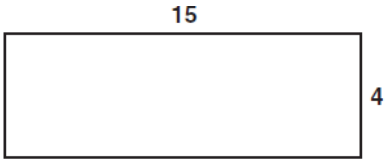


Figure 1

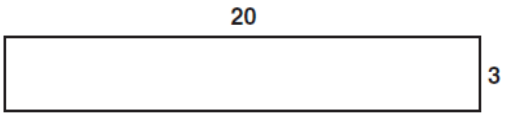


Figure 2

Chapter 2 Angles

Learning Outcome

At the end of the lesson, a student should be able to:

3.2.1 Name, describe and construct angles

Question 1
Item Type: Short Answer Question
Context: Societal
Competency: Connection and Representation
Level of Thinking: Remembering

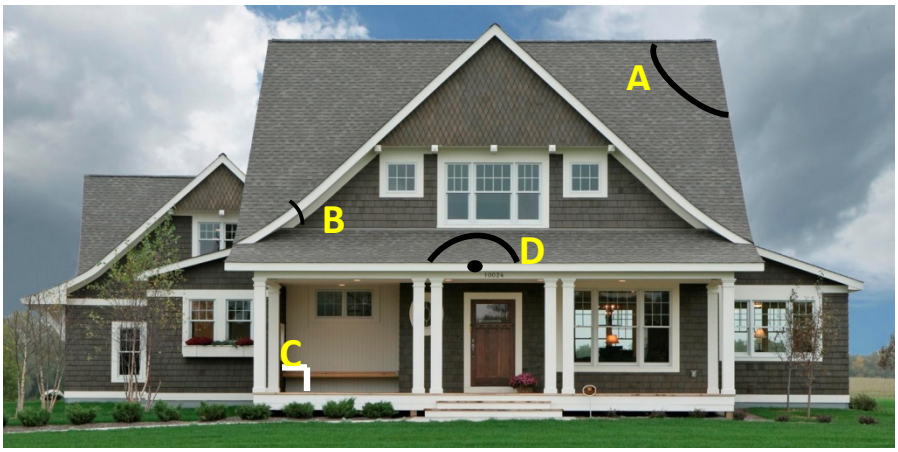


Figure 3.13

Study the figure 3.13 and name the angles marked A, B, C, D.

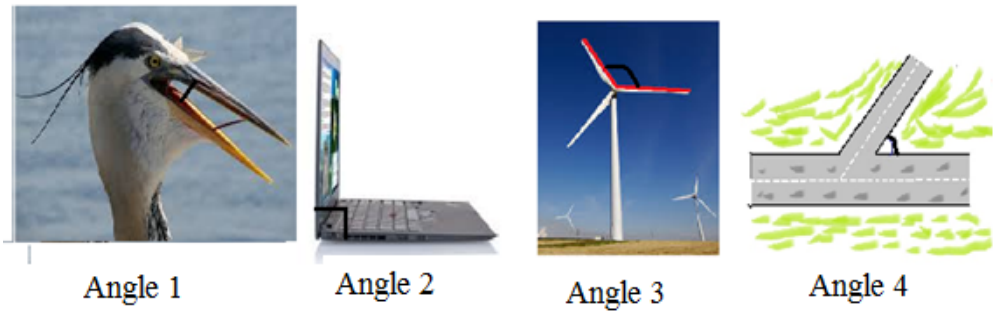
A Obtuse angle

B Acute angle

C Right angle

D Straight angle

Question 2
Item Type: Multiple Choice Question
Context: Scientific
Competency: Reasoning and Argument
Level of Thinking: Analyzing



Look at *Figure 3.14.*

In which of the following are the angles ordered by size, from greatest to least?

A	angle 2	angle 1	angle 3	angle 4
B	angle 4	angle 3	angle 1	angle 2
C	angle 3	angle 2	angle 4	angle 1
D	angle 1	angle 4	angle 2	angle 3

Answer: C

Question 3
Item Type: Short Answer
Context: Societal
Competency: Representation
Level of Thinking: Creating

Different types of angles can be formed with the hands of the clock. Construct the hands on the clock to match against the types of angles.

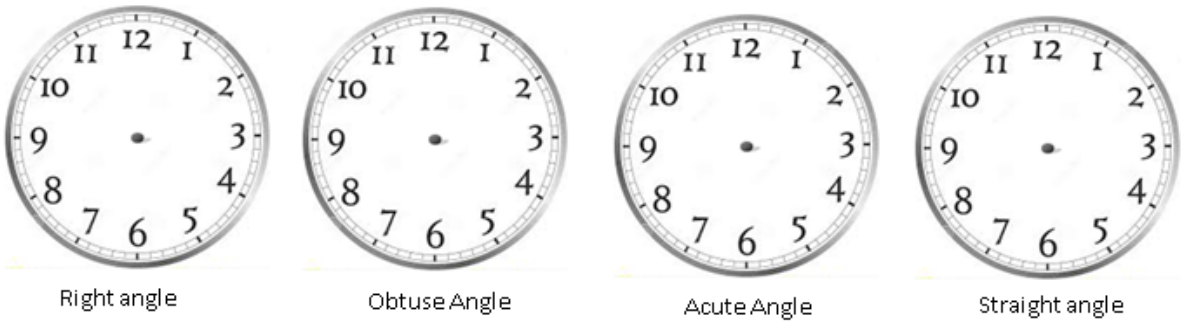
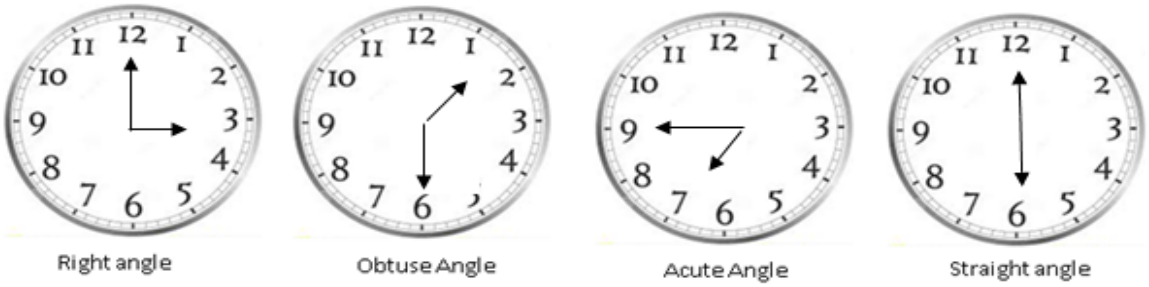


Figure 3.15

Answer:



Question 4
Item Type: Short Answer Question
Context: Scientific
Competency: Connections
Level of Thinking: Understanding

Capital letters in the English alphabets form that have different angles. Write down three letters that have acute angle and three letters that have right angle.

Sample Answers

Acute angle	A	K	Z	M	N

Right angle E F H I L

Question 5
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation
Level of Thinking: Understanding

Namda baked a cake and divided it equally into 10 parts as shown in *Figure 3.16*

Figure 3.16

An angle was created when he ate 4 slices in an order. What type of angle will it appear to be?

A Acute angle
B Obtuse angle
C Right angle
D Straight angle

Answer: B Obtuse angle

Chapter 3 Volume

Learning Outcome

At the end of the lesson, a student should be able to:

3.3.1 Demonstrate an understanding of volume as the number of units it takes to build a solid

Question 1

Item Type: Extended Response Question
Context: Occupational
Competency: Mathematising, Problem solving and Communication
Level of Thinking: Applying

The truck for Tashi Commercial Corporation has interior dimension of 5 m × 2.5 m × 2 m. The dimensions of the storage boxes 50 cm ×100 cm × 50 cm.

Figure 3.17

If Tashi Commercial Corporation needs to move 250 storage boxes, determine how many trucks will be needed?

Answer: Dimensions of interior of truck = 5 m ×2.5 m ×2 m

Volume of interior of truck = 25 m^3

Dimensions of storage boxes = 50 cm ×100 cm×50 cm

= 0.5 m ×1 m×0.5 m

= 0.25 m^3

In one truck=25 $m^3 \div$ 0.25 m^3 = 100 cartoon boxes

The number of truck needed = 3 trucks

Question 2
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation
Level of Thinking: Analyzing

Kuenga bought a pair of shoes as shown in *Figure 3.18* and wanted to find out the amount of space inside the shoe box. What is the best estimation of the shoe box of 15 cm by 12 cm by 18 cm?

A 560 cubic millimetres
B 560 cubic centimetres

C 560 cubic decimetres
D 560 cubic metres

Figure 3.18

Answer: B 560 cubic centimetres

Question 3
Item Type: Multiple Choice Question
Context: Occupational
Competency: Mathematising, Problem solving and Reasoning and argument
Level of Thinking: Analyzing

The popcorn shop sells popcorn in 4 different packets as in *Figure 3.19.*

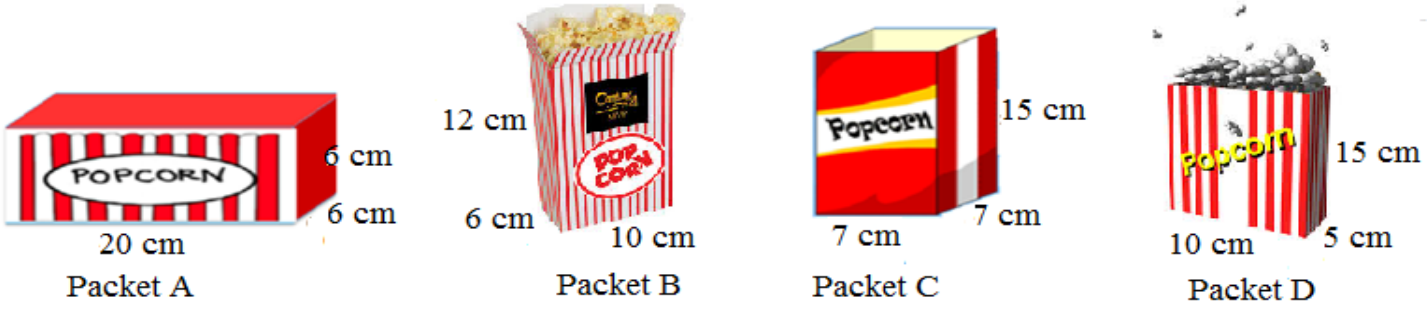


Figure 3.19

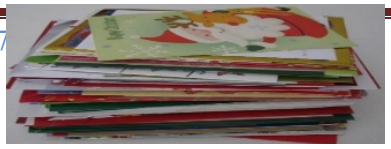
Sherab bought the packet that holds the maximum popcorn. Which packet did he buy?

A Packet A
B Packet B
C Packet C
D Packet D

Answer: D Packet D

Question 4
Item Type: Multiple Choice Question
Context: Scientific
Competency: Problem Solving, Mathematising and Reasoning and argument
Level of Thinking: Understanding

A Stack of greeting cards is piled 12 cm tall as in *Figure 3.20.* These cards measure 10 cm by 15 cm. What is the volume of the box needed to store these cards? Explain how you know the



answer.

Figure 3.20

Answer: Volume of the box of pile needed = l × w ×h

= 15 cm ×10 cm ×12 cm

= 1800 cm^3

The box should at least have the volume of 1800 cm^3 so that it could store the stake of cards of 12 cm tall is 10 x 15 x 12.

Learning Outcome
At the end of the lesson, a student should be able to:
3.3.2 Estimate and measure volume using non-standard units

Question 1
Item Type: Multiple Choice Question
Context: Scientific
Competency: Problem solving and Reasoning and argument
Level of Thinking: Analyzing

Pema opens a box filled with 120 cubes of same size. She saw 20 cubes from the top.

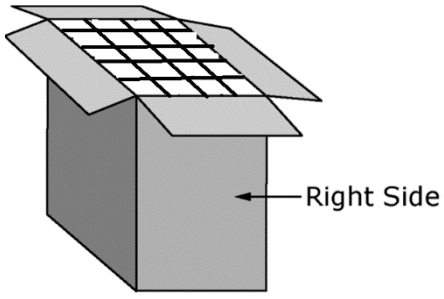


Figure 3.21

How many cubes can she see if she opens the box from the side shown above?

A 120 cubes
B 36 cubes
C 24 cubes
D 20 cubes

Answer: C 24 cubes

Question 2
Item Type: Short Answer Question
Context: Personal
Competency: Representation and Mathematising
Level of Thinking: Creating
Using all the cubes, make two different rectangular prisms and write their volume.

Figure 3.22

Sample Answer:

1) Volume =3 by 4 by 2, V = 2 by 2 by 3

2) Volume = 2 by 2 by 2, V= 7 by 4 by 1

Question 3
Item Type: Multiple Choice Question
Context: Societal
Competency: Communication and Representation
Level of Thinking: Analyzing

Tobden has lots of dairy milk chocolate bars. He wanted to gift his brother Rabgay some chocolate.

10cm

thickness of the chocolate bar is about 1cm

Figure 3.23

He packed the chocolates in the box given in figure 3.23. How many chocolate bars will fit in the box?

A 23
B 24
C 25
D 26

Answer: B 24

Question 4
Item Type: Multiple Choice Question
Context: Societal
Competency: Connections and Mathematising
Level of Thinking: Analyzing The *Figure 3.24* given below is the cartoon box.

Non-standard units

I II III IV

If you are to measure its volume, which non-standard unit will be the most suitable?

A IV
B III
C II
D I

Answer: D I

Learning Outcome
At the end of the lesson, a student should be able to:
3.3.3 Connect volume to dimensions

Question 1
Item Type: Multiple Choice Question
Context: Scientific
Competency: Representation, Mathematising and Reasoning and argument
Level of Thinking: Analyzing

Kencho is helping her younger sister to fill a box using alphabet blocks. To fill one layer, it takes nine blocks. How many such blocks would be required to fill the six layers?

A 26
B 36
C 54
D 81

Answer: C 54

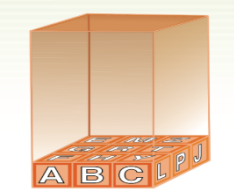


Figure 3.25

Question 2
Item Type: Short Answer Question
Context: Scientific
Competency: Representation, Communication and Reasoning and argument
Level of Thinking: Analysing

A teacher asks students to build four different rectangular prisms using linking cubes. For each prism, students need to record the dimensions and the number of cubes used in the table given below.

Figure 3.26

Prism	Length (l)	Width (w)	Height (h)	Number of cubes
A				
B				
C				
D				

Describe the relationship between the dimensions of the prism and number of cubes.

Answer:

Number of cubes is equal to length x width x height.

Question 3
Item Type: Multiple Choice Question
Context: Occupational
Competency: Mathematising and Problem solving
Level of Thinking: Applying

Pema wanted to fill the path with gravels with the length and breadth given in Figure 3.27. How much gravel is needed if he wants to add 5 cm of gravel over the entire path?

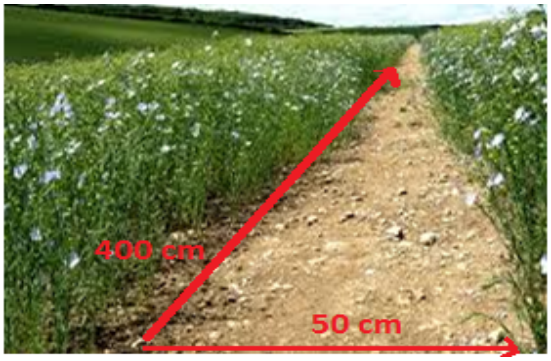


Figure 3.27

A 100,000 cm^3
B 10,000 cm^3
C 1,000 cm^3
D 100 cm^3

Answer: A 100000 cm^3

Question 4
Item Type: Multiple Choice Question
Context: Personal
Competency: Mathematising and Representation
Level of Thinking: Applying

I have to build a box for my mathematics project with a volume of 72 cm^3. The base of the box is 6 cm long and 4 cm wide. How high should I build the box?

A 3 cm
B 4 cm
C 5 cm
D 6 cm

Answer: A 3 cm

Question 5
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation
Level of Thinking: Applying

The fish tank is half filled with water as shown in the figure 3.28. What is the volume of water in the tank?

A 10,000 cm^2
B 20,000 cm^2
C 30,000 cm^2
D 40,000 cm^2

Answer: B 20,000 cm^2

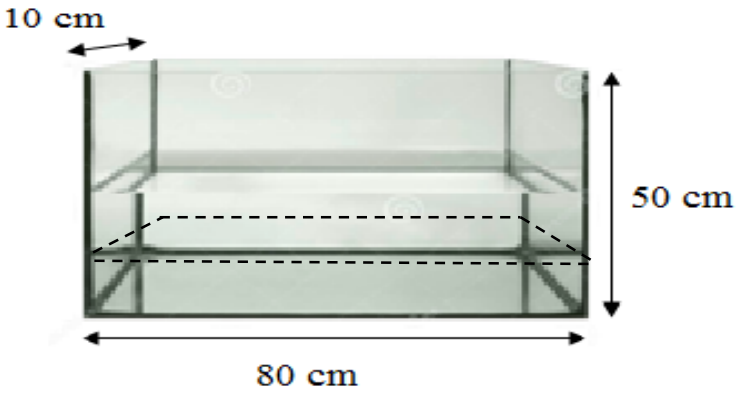


Figure 3.28

UNIT 4
MULTIPLICATION AND DIVISION WITH GREATER NUMBERS

Chapter 1 Multiplication

Learning Outcome

At the end of the lesson, a student should be able to:

4.1.1 Multiply whole numbers by tens using different strategies

Question 1
Item Type: Multiple Choice Question
Context: Personal
Competency: Problem solving and Reasoning and argument
Level of Thinking: Analysing

Apple sold during autumn, 2017

Months	Apple sold (kg)	Rate (Nu)
August	285	70
September	340	80
October	335	80
November	290	90

Figure 4.1

In autumn, Aum Kezang sales her apples daily. In which month did she make more money?

A August
B September
C October
D November

Answer: D November

Question 2
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem Solving and Mathematising
Level of Thinking: Applying

Figure 4.3

Namgay Zam is a Bhutanese journalist. She interviewed 85 people in 2015 and 87 people in 2016. The time spent to interview one person is 50 minutes. How much time did she spend to interview people in 2015 and 2016 together?

A 4,250 minutes
B 4,350 minutes
C 8,600 minutes
D 8,600 hours
Answer: C 8,600 minutes

Question 3
Item Type: Multiple Choice Question
Context: Occupational
Competency: Problem Solving and Mathematising
Level of Thinking: Applying

The distance between Paro and Phuntsholing is 165 km. A taxi from Paro goes to and returns from phuntsholing daily. How many kilometers does the taxi travel in the month of April?

A 190 km
B 2,400 km
C 5,900 km
D 9,900 km
Answer: D 9,900 km

Learning Outcome
At the end of the lesson, a student should be able to:
4.1. 2 Estimate and divide 3-digit number by 1-digit number (with / without regrouping)

Question 1
Item Type: Long Question Answer
Context: Societal
Competency: Reasoning and argument, Problem solving and Communication
Level of Thinking: Analyzing
In a football stadium, gallery A has 20 compartments where 200 people can sit in each compartment and gallery B has 14 compartments where 300 people can sit in each compartment. Which gallery can accommodated more people? Why?
Solution: Gallery A has 20 compartment so it can accommodate 20 x 200 = 4,000 people.
Gallery B of 14 compartments can accommodate 14 x 300 = 4,200 people
Therefore gallery B can accommodate more people than gallery A.

Question 2
Item Type: Long Question Answer
Context: Scientific
Competency: Representation
Level of Thinking: Applying

Bank of Bhutan has the following Foreign Exchange Rate as of 2nd January 2017.

Foreign Exchange Rate		
Note	**Buy**	**Sell**
US Dollar	66.00	69.00
Pound	82.10	84.40
Euro	70.40	72.35
Swiss Franc	65.60	67.45

Hongkong dollar	8.60	8.85

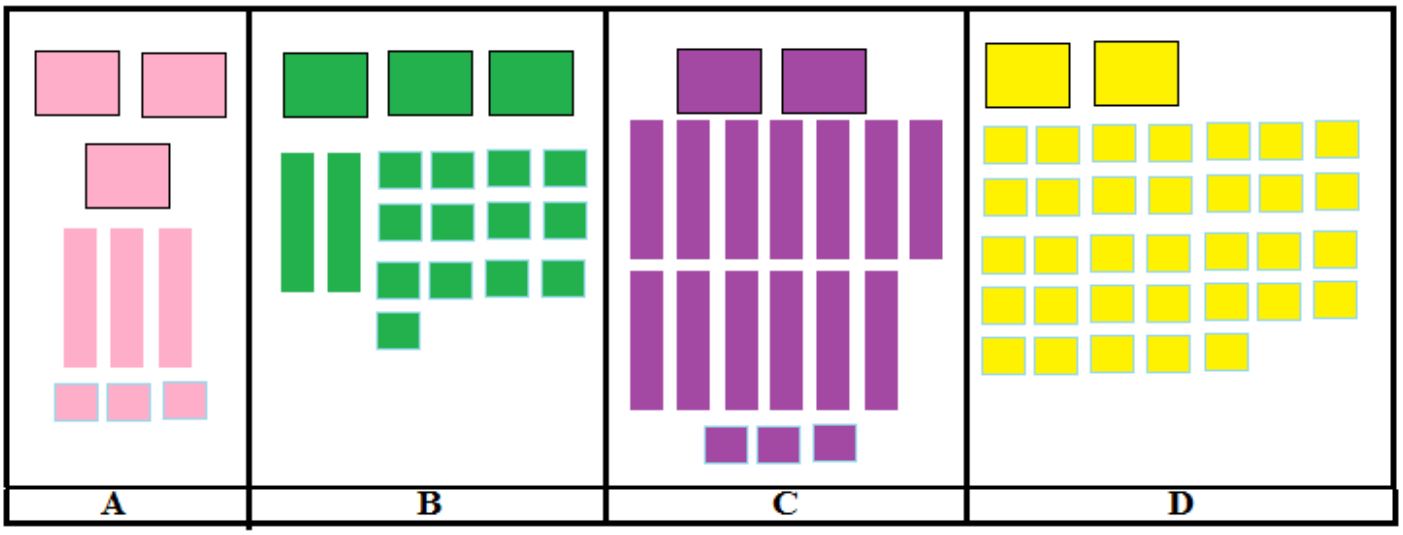
Figure 4.5

i) How much do you need to pay buy US$ 800?
Solution: US $ 800 X 69.00 = Nu 55, 200

ii) How much Ngultrum will you get if you sell US$ 300 to the Bank?
Solution: US$ 250 X 66.00 = Nu 13, 200

Question 3
Item Type: Long Question Answer
Context: Scientific
Competency: Reasoning and argument and Connections
Level of Thinking: Analysing

Four models for the number 333 are given. Which is the most appropriate?



Answer: A

Question 4
Item Type: Long Question Answer
Context: Personal
Competency: Problem solving and Connections
Level of Thinking: Applying

Figure 4.6 shows the flight schedule for Druk Air from 30th Oct – 31st Jan 2017.

Flight Number	1440	Bangdogra (IXB)	1915	PARO (PBH)	
KB204	0910	PARO (PBH)	1110	DELHI (DEL)	A319
KB205	1205	DELHI (DEL)	1405	PARO (PBH)	A319
KB500	0900	PARO (PBH)	0940	KOLKATA (CCU)	A319

Figure 4.6

Druk Air flies with a constant speed of 880 km/hr. How far is Delhi from Paro? [Distance = speed x time]

Solution: Speed: 880 km/hour Time: 2 hour
Distance: speed x time
880 km/ hr x 2hr
= 1760km
Delhi is 1760 km away from Paro.

Question 5
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem Solving and Connections
Level of Thinking: Applying

Tang Central School awarded the following school bags to 12 best students at the end of the year. How much did the school pay for the bags?

Nu 400 per bag

Nu 455 per bag

Nu 355 per bag

Nu 246 per bag

A Nu 1,456
B Nu 4,368
C Nu 4,364
D Nu 4,800
Answer: C Nu 4,368

Question 6
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem solving and Connections
Level of Thinking: Understanding
These two houses were built by Bhutanese carpenter using local materials with different measurement.

House A

House B

The perimeter of House A is 255 m and House B is 4 time larger than House A. What is the perimeter of house B?
A 259 m
B 510 m
C 1020 m
D 1030 m
Answer: C 1020 m

Question 7
Item Type: Short Answer Question
Context: Occupational
Competency: Problem solving and Connections
Level of Thinking: Applying

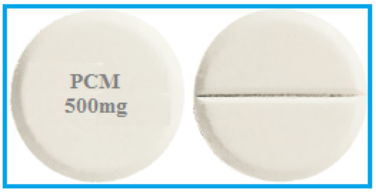
Figure 4.9

The above house has the windows of same area. The area of one window is 144 m^2. What would be the total area of the windows?

A 1440 m^2
B 1008 m^2
C 1152 m^2
D 576 m^2

Answer: C 1152 m^2

Question 8
Item Type: Short Answer Question
Context: Personal
Competency: Problem solving, Connections and Communication
Level of Thinking: Understanding/Applying



You have a headache and you go to a doctor. The doctor advises you to take half paracetamol in the morning and other half in the evening.

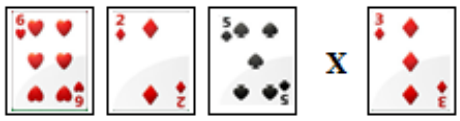
1. How many milligrams of paracetamol will you take one in the morning?
2. How many milligrams of paracetamol will you take in a week?
3. If 500 mg makes 1 tablet, how many tablets will you take in one week?

Solution:

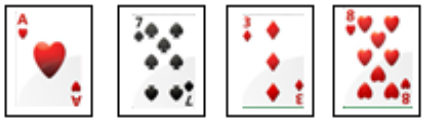
1. $\frac{1}{2}$ of 500 mg = 250mg
2. 500 mg X 7 days = 3500mg
3. 7 tablets

Question 9
Item Type: Multiple Choice Question
Context: Societal
Competency: Connections, Reasoning and argument, Communication and Representation
Level of Thinking: Analyzing

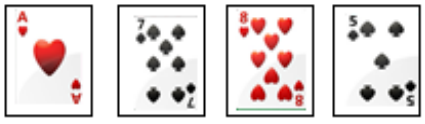
In a card game, you have to pick three cards and arrange them to form a 3 digit number. Then pick another card and multiply the 3 digit number to get a new number. While playing with your friend, you got the following cards.



Which arrangement of cards represent the product of above multiplication sentence?

A 

B 

C 

D 

Answer: B

Chapter 2 Division

Learning Outcome

At the end of the lesson, a student should be able to:

4.2.1 Divide whole numbers by tens and hundreds using different strategies

Question 1
Item Type: Short Answer Question
Context: Occupational
Competency: Connections, Communication, Mathematical language and Operation
Level of Thinking: Understanding/Applying

This is the pay slip of Mr. Tashi Penjor, Principal of Dhur Primary School, Bumthang.

				Bumthang Dzongkhag				
				Department: Dhur Primary School, Bumthang				
Pay- Slip for the month of : November (2016 - 2017)								
Employee Id:		889034						
Name:		Tashi Penjor						
Basic Pay	54000/			Description				Amount
	Allowance		4800	Consumer loan				11400
	House rent Allowance		4800	Salary Saving Schemes				637
				Civil Service's Welfare Scheme				200
				House Rent				2953
				GIS				400
				HC				336
				PF				2639
				TDS				1882
				Total deduction:				15190
Gross Pay.	63600/			Net Pay:				38810

Figure 4.10

a. What is his basic pay?
b. What is his net pay?
c. Which month's pay has been shown in *Figure 4.10*?
d. What is his earnings for a day as per his basic pay?

Answer: a) 5400 b) 38810 c) November d) 54000 / 30 = 1800

Question 2
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem Solving and Connections
Level of Thinking: Applying

This is Changlimithang football stadium.

Note: 100 Yards = 90 m

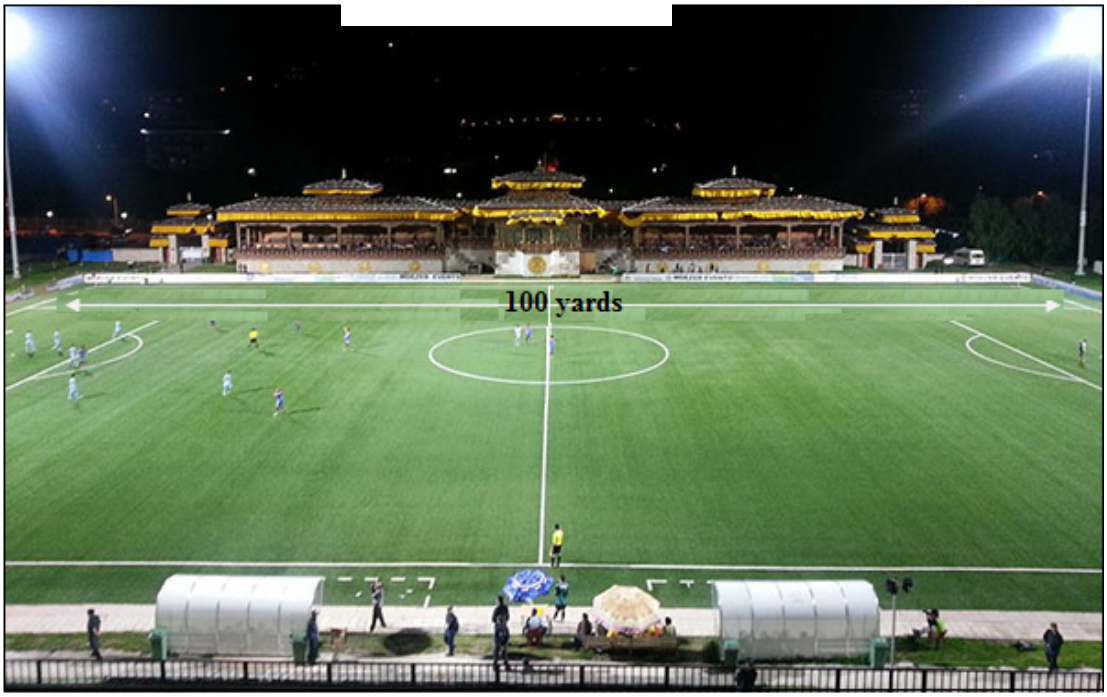


Figure 4.11

The area of a football ground is 4050 m^2. What would be the width of the football ground in metres?

A 45 m
B 50 m
C 90 m
D 100 m

Answer: A 45 m

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Problem Solving
Level of Thinking: Applying

Figure 4.12

Every Saturday Ap Bokto goes to the centenary market to buy turnip. He ate 60 kg of turnip in a year. If he spends around Nu 660, what will be the cost of 1kg turnip?

A 11 kg
B 12 kg
C 15 kg
D 20 kg
Answer: A 11 kg

Learning Outcome
At the end of the lesson, a student should be able to:
4.2.2 Divide whole numbers by hundreds without re-grouping

Question 4
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation and Problem solving
Level of Thinking: Applying

Students of Changzamtog Lower Secondary School collected waste bottles from four different places to mark the World Environment Day on 5th June, 2016 as shown in *Figure 4.13*

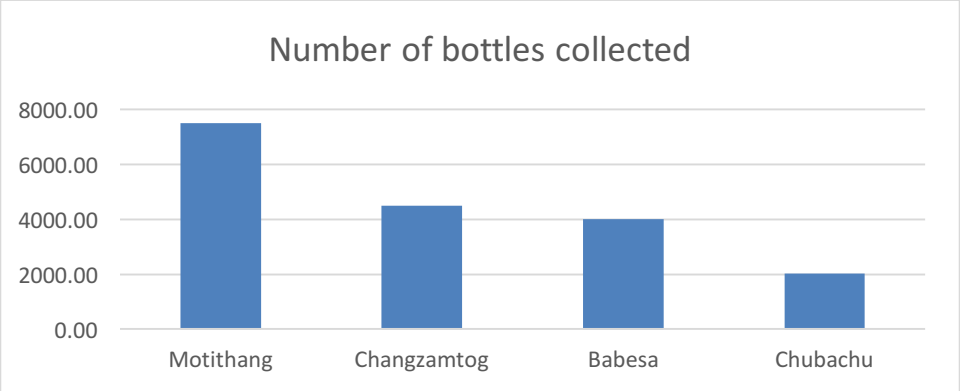


Figure 4.13

They need to pack the bottles in sacks to sell. If a sack can fit 200 bottles, how many sacks would be required to fit all the bottles?

A 52
B 57
C 80
D 90
Answer: D 90

Question 2
Item Type: Short Response Question
Context: Personal
Competency: Problem Solving, Connections and Communication
Level of Thinking: Applying

You are riding in the car with your mother to the Bhutan Oil Distribution (BOD) station. Here is the information that you see at the station.

Petrol: Nu 60 per litre
Diesel: Nu 50 per litre
Gas cylinder: Nu 535 per cylinder

1. Your mother has Nu 600, how many litres of petrol can she buy?

Solution: Nu 600 ÷ 60
= 10 litres. She can buy 10 litres of petrol

2. With the same amount, how many litres of diesel can she buy?

Solution: Nu 600 ÷ 50
= 12 litres. She can buy 12 litres of diesel with same amount of money

Learning Outcome
At the end of the lesson, a student should be able to:
4.2.2 Divide whole numbers by hundreds

Question 1
Item Type: Multiple Choice question
Context: Scientific
Competency: Connections and Problem solving
Level of Thinking: Understanding

Health and Nutrition Division under MoE provided 2500 iron tablets to Loselling Middle Secondary School. The school health coordinator distributed to 500 girls. How many tablets did each girl get?

A 5 tablets
B 6 tablets
C 7 tablets
D 8 tablets

Answer: A 5 tablets

Question 2
Item Type: Short Answer Question
Context: Societal
Competency: Representation, Mathematical language and Operation and Problem Solving
Level of Thinking: Applying

The height of the 6 stored building is 6300 cm.

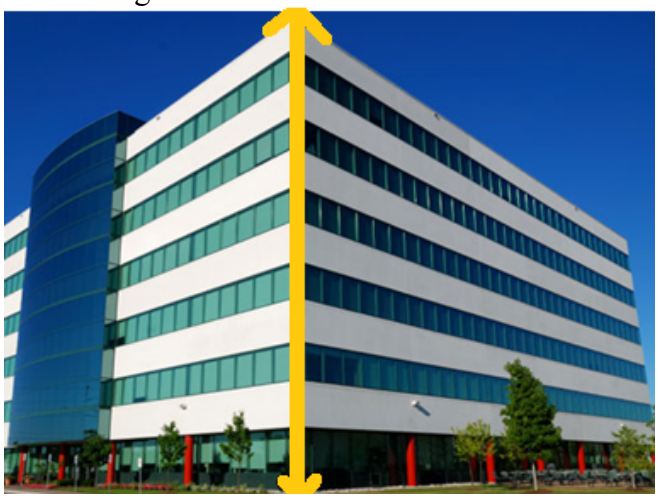


Figure 4.14

1. What is the height of the building in metres?
Solution: 4200 cm ÷ 100 = 42 m

2. What is the height of the 5^{th} floor?
Solution: 42 m ÷ 6 = 7 m floor of each building.

Learning Outcome
At the end of the lesson, a student should be able to:
4.2.3 Divide three digit numbers by one digit number with regrouping

Question 1
Item Type: Short Answer Question
Context: Scientific
Competency: Reasoning and argument, Mathematical language and Operation and Connections
Level of Thinking: Analysing

The following *figure 4.14* shows the miles covered by three butterflies of Bhutan.

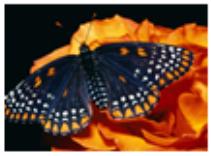
Types of butterfly	Distance covered in a week
A 	574 miles
B 	672 miles
C 	588 miles

Figure 4.14

1. How many miles did butterfly A cover in a day?
Solution: 574 miles

2. Which butterfly flew the furthest in a day?
Solution: Butterfly B

Question 2
Item Type: Long Answer Question
Context: Societal
Competency: Mathematising and Representation
Level of Thinking: Understanding

The *figure 4.15* is the report of newspaper sold by the each media in Haa Dzongkhag. Which newspaper has the best sale in week?

Print Media	Number of copies sold at Haa in a month
Kuensel	9,652
Bhutan time	7,765
Bhutan Observer	5,256
The Journalist	1,352
The Bhutanese	8,764

Figure 4.15

Solution: Kuensel has the best sale.

Learning Outcome
At the end of the lesson, a student should be able to:
4.2.4 Divide three / four digit numbers by one digit number with regrouping

Question 1
Item type: Long Answer Question
Context: Societal
Competency: Connection, Communication, Mathematical language and Operation
Level of Thinking: Applying

The highest mountain on the Earth is Mount Everest in Nepal. It is 8,848 m high. Many people try to climb Mount Everest every year. Edmund Hillary and Tenzing Norgay were the first to climb Mount Everest. The climbing season is between April to October every year.

Figure 4.16

1. Estimate the height of Mount Everest in kilometres?
   Solution: 9000 km

2. How many months are open for the people to climb Mount Everest?
   Solution: Seven months

3. If a person takes 9 days to climb Mount Everest, about how many metres does he climb in 1 day?
   Solution: 9000 / 9
   1000 m

Question 2
Item Type: Short Answer Question
Context: Societal
Competency: Reasoning and argument, Communication
Level of Thinking: Applying /Analysing

The following are the rice sold in NEDUPZAM GENERAL SHOP.

Figure 4.16

1. What is the cost of each type of rice per kilogram?

Solution:
Sack A: 500/5 = Nu 100
Sack B: 630/9 = Nu 70
Sack C: 1500/30 = Nu 50

2. If you are a shopkeeper for which rice will you get good prize? Why?

Solution:
Rice in Sack A will get good prize because the cost of one kilogram of rice is Nu 100 which is higher than other two.

Question 3
Item Type: Long Answer Question
Context: Scientific
Competency: Connections, Communications and Problem solving
Level of Thinking: Applying

A memory stick is used to store songs, movies and other related files. Tshewang has a memory stick of 8 GB. He wants to store Bhutanese songs. Each song is 8 MB. (Note: 1 GB = 1000 MB)

Figure 4.17

1. How many songs will be stored in 8 GB memory stick?
   Solution: 1 GB = 1000 MB
   8 GB = 8000 MB
   8000 ÷ 8 = 1000 songs

2. He wants to save new songs which requires 2,400 MB space. How many songs does he need to delete to get the required space?
   Solution: 2400 MB ÷ 8 MB = 300 songs needs to be deleted.

Question 4
Item Type: Short Answer Question
Context: Scientific
Competency: Mathematising and Reasoning and argument and Communication
Level of Thinking: Analyzing

Takin is the national animal of Bhutan. The table below gives the information about the weight of male and female Takin.

Male Takin

5 female Takins = 1,610 kg

6 male Takins = 1,800 kg

Figure 4.18

Female Takin

1. What is the weight of one female Takin?
Solution: 1610 kg ÷ 5 = 322 kg

2. Which Takin weighs more?
Solution: Male Takin: 1800 ÷ 6 = 300 kg
Female Takin: 1610 kg ÷ 5 = 322 kg
Female Takin weighs more.

Learning Outcome
At the end of the lesson, a student should be able to:
4.2.5 Division of whole numbers as fraction in real life

Question 1
Item Type: Short Answer Question
Context: Personal
Competency: Connection, Problem solving and Representation
Level of Thinking: Applying

You have a cash memo of items to make ema datsi for ten people.

Cash Memo

Meto Tshongkhang
Thimphu

No. 543 Date:15.11.2017
Mr/Ms: Pema Lhamo

Sl No	Particulars	Quantity	Rate	Amount Nu.
1	Dry red chilli	2 Kg	1,500	3,000
2	Refined oil	1 L	112	112
3	Onion	1 Kg	40	40
4	Local cheese	8 balls	60	480
Total: *Three thousand six hundred thirty two only*				3,632

Yeshi Lhamo
Signature

Figure 4.19

Fill in the blank

a. The cost for a ball of cheese is…….
b. To make ema datsi for 5 people ……..ml oil is required.
c. The cost of $\frac{1}{2}$ kg chilli is Nu. …….
d. $\frac{1}{4}$ kg of onion will cost Nu……
e. To make ema datsi for 20 people……..balls of cheese is needed.

Solution:

a. Nu 60
b. 1/10 x 5 = 1/2 L
c. 1500/2 = Nu 750
d. 40 x 1/4 = Nu 10
e. 10 people = 8 balls
   20 people = 8 x 2 =16 balls

Learning Outcome

At the end of the lesson, a student should be able to:

4.2.6 Divide three digit numbers by one digit number with regrouping

Question 1
Item Type: Long Answer
Context: Personal
Competency Skill: Reasoning and argument, Problem solving and Communication
Level of Thinking: Evaluating

Figure 4.20

1. Ap Dokdo needs to buy 50 kg of chili. If you buy in loose, chili per kg costs Nu 300 whereas chili per sack of 50 kg costs Nu 12,000. Why does Ap Dokdo think that buying sack of chilies is cheaper?

Solution: Loose

1kg = Nu 300
50 kg = Nu 300 X 50
= Nu 15,000

Sack

1 sack = 12, 000
1 kg = 12000 ÷ 50 = 240
1 kg = Nu 240
50 kg = Nu 240 X 50
= Nu 12,000

Buying 50 kg of loose chillies cost Nu 15,000 whereas buying chillies in sack cost Nu 12,000.

Question 2
Item Type: Long Answer Question
Context: Personal
Competency: Representation, Mathematising and Mathematical language
Level of Thinking: Creating

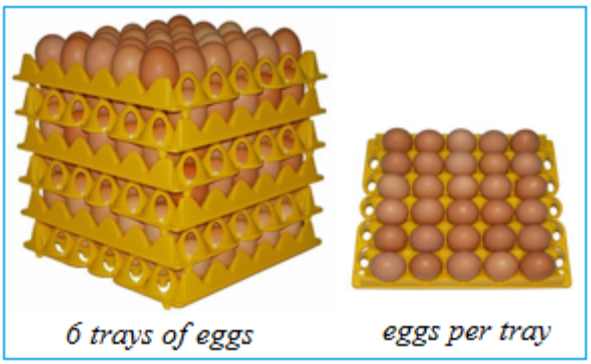


Figure 4.21

1. Write a multiplication and division sentences based on above *figure 4.21.*

Solution: Multiplication sentence

6 x 5 = 30
30/6 = 5
30/5 = 6

6 x 30 = 180
180/6 = 30
180/30 = 6

Question 3
Item Type: Long Answer Question
Context: Personal
Competency: Representation, Problem Solving and Mathematising
Level of Thinking: Creating

Bhutan scouts association is organizing five days Nachung Scout Camp. 266 Nachung Scout (150 boys and 116 girls) have registered for the camp and 8 scout leaders (4 male and 4 female) will attend the camp. The camp has 7 rooms and each room has with 40 beds.
The following are rules of the room.

Camp Rules

- Boys and girls must sleep in separate rooms
- At least one leader must sleep in each room
- The leader in the room must be of the same gender as the scout

Room Number	Number of boys	Number of girls	Gender of leaders
1			
2			
3			
4			
5			
6			
7			

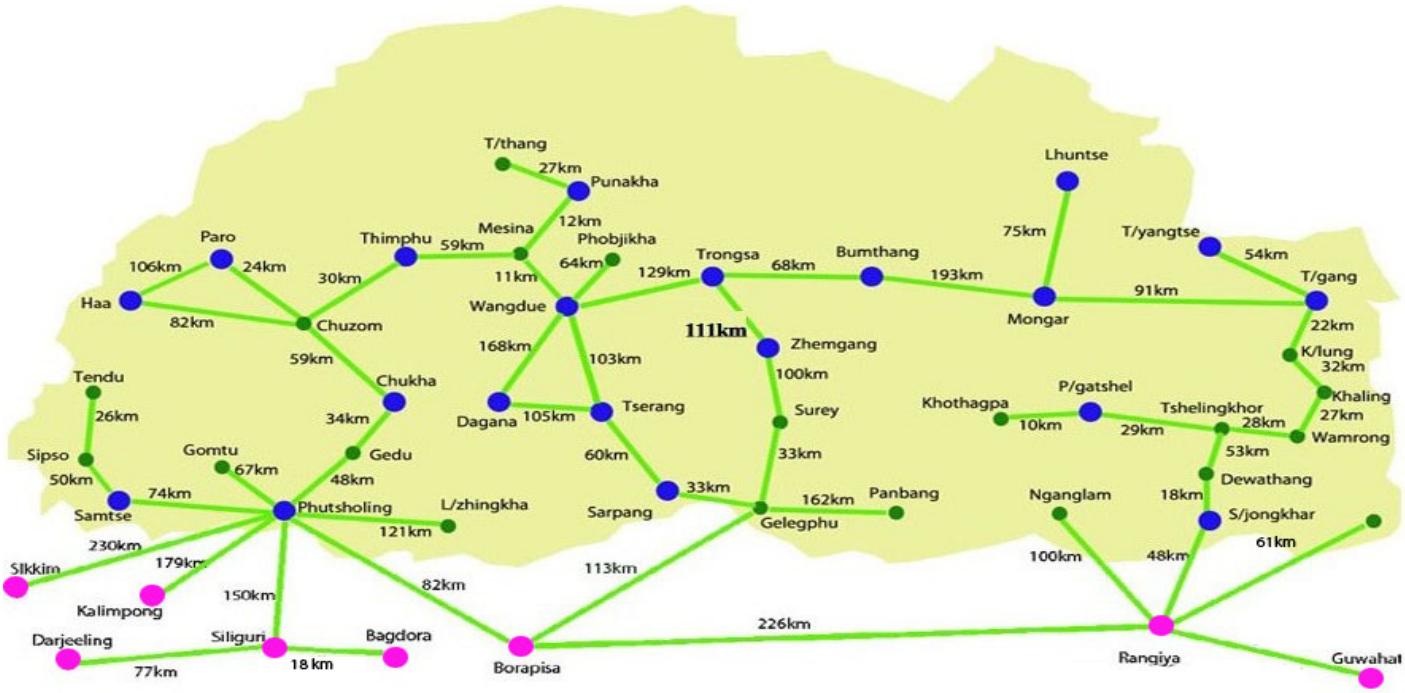
Fill the table below to allocate 270 scouts and 8 leaders based on camp rule.

Suggestive Solution:

Divide the rooms by looking at beds in the room and the number of boys and girls.
Boys 150 ÷40 = 4 rooms (39+ 39 +39 + 33). Male Scout leaders (1 + 1+1 +1)
Girls 116 ÷ 40 = 3 rooms (39 + 39 + 38). Female scout leaders (1+1+2)

Question 4
Item Type: Fill in the blank
Context: Personal
Competency: Representation, Reasoning and argument and Communication
Level of Thinking: Analysing

Given below is the RSTA road map of Bhutan, showing the distance between towns in kilometers.



1. You are at Gelegphu. You need to come to Thimphu for a very important work. Which is the shortest route you would choose? Why?

Solution: Route from Gelegphu to Thimphu

Route 1: Gelephu – Sarpang – Tsirang – Thimphu
Distance = 266 km

Route 2: Gelegphu – Trongsa – Thimphu
Distance = 443 km

Route 3: Gelegphu – Phuntsholing – Thimphu
Distance = 366 km

I would choose Route 1 as this is the shortest route as compared to others.

UNIT 5
GEOMETRY

Chapter 1 Triangles and Quadrilaterals

Learning Outcome

At the end of the lesson, a student should be able to:
5.1.1 Name, describe and construct scalene, isosceles and equilateral triangles

Question 1
Item Type: Multiple Choice Question
Context: Scientific
Competency: Using mathematical tools
Level of Thinking: Remembering

The *figure 5.1* is a geometrical instrument in the form of triangular shape.

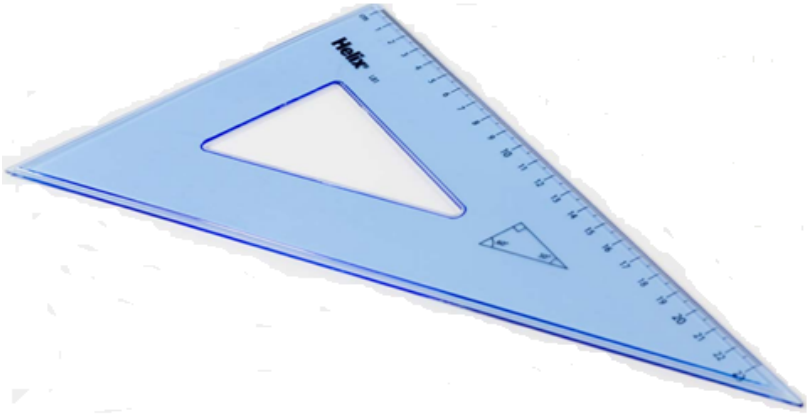


Figure 5.1

Identify the type of triangle.

A an equilateral triangle
B an isosceles triangle
C a scalene triangle
D a right triangle

Answer: C a scalene triangle

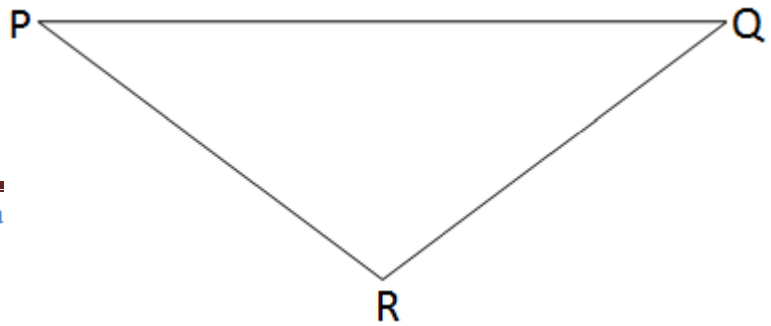
Question 2
Item Type: Multiple Choice Question

Context: Societal
Competency: Representation and Communication
Level of Thinking: Remembering

A figure 5.2 is a  flower garden in the form of triangular shapes.

Figure 5.2

Below is the model representation of one of the triangular garden with names PQR.



Which is the longest side in the triangle PQR?
A PR
B PQ
C RQ
D PQR

Answer: B PQ

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Communication
Level of Thinking: Understanding

Teacher demonstrated an activity to teach the concept of equilateral triangles. Which of the following best describes its properties?

A All the three sides and the three angles are equal.
B Two sides and two angles are equal.
C One side and one angle are equal.
D No side and angle is equal.

Answer: **A** All sides and angles are equal.

Learning Outcome
At the end of the lesson, a student should be able to:
5.1.2 Make generalizations about angle, side length, diagonals, symmetry and parallel side properties of parallelogram, rectangle, kite, rhombus and trapezoid

Question 1
Item Type: Multiple Choice Question
Context: Personal

Competency: Representation
Level of Thinking: Understanding

Refer the *Figure 5.3* below.

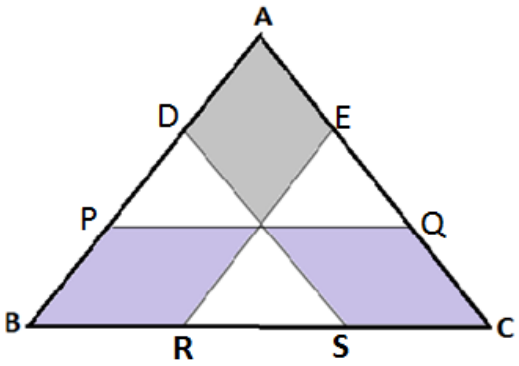


Figure 5.3

a) How many equilateral triangles are there in the figure given above?

A Two
B Three
C Four
D Seven

Answer: D Seven

b) Identity all parallel lines in the *Figure 5.3*

Answer:
BC & PQ
AC & DS
AB & ER

Question 2
Item Type: Multiple Choice Question
Context: Personal
Competency: Communication
Level of Thinking: Understanding

How many lines of symmetry can be drawn for the *Figure 5.3?*

A One
B Two
C Three
D Four

Answer: C Three

Question 3
Item Type: Multiple Choice Question
Context: Occupational
Competency: Connections and Representation
Level of Thinking: Applying

A carpenter makes a study table for his son. The top of the table is a polygon, where the opposite angles and sides are equal to make a study table for his son.

What is the name of the polygon which best describes the study table.

A Kite
B Parallelogram
C Pentagon
D Trapezoid

Answer: D Parallelogram

Question 4
Item Type: Multiple Choice Question
Context: Societal
Competency: Connections
Level of Level: Applying

Which dotted line among the following figure is a line of symmetry?

A	
B	
C	
D	

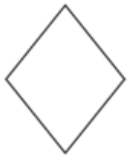
Answer: D

Question 5
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation
Level of Thinking: Remembering

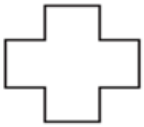
As part of his homework, Tashi was asked to draw any four shapes and find the maximum number of lines of symmetry. He comes out with following 4 shapes.

Which of the shapes has maximum lines of symmetry?

A 

B 

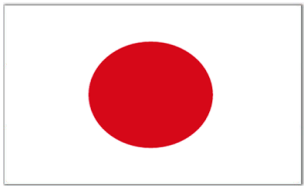
C 

D 

Answer: C

Question 6
Item Type: Multiple Choice Question
Context: Societal
Competency: Connections
Level of Thinking: Understanding

Which flag has exactly four lines of symmetry?

			
A	B	C	D

Answer: D

Question 7
Item Type: Multiple Choice Question
Context: Scientific
Competency: Representation and Connections
Level of Thinking: Remembering

Sonam designed a ship as shown in Figure *5.4.*

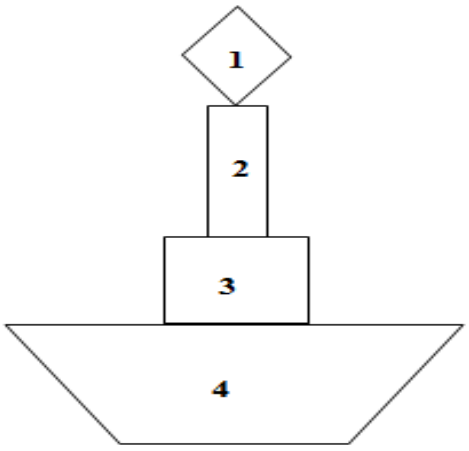


Figure 5.4

Select the correct polygons against the numbers in the Figure 5.4.

	1	2	3	4
A	Rhombus	Rectangle	Square	Trapezoid
B	Rectangle	Square	Trapezoid	Rhombus
C	Trapezoid	Rectangle	Rhombus	Square
D	Square	Trapezoid	Rhombus	Rectangle

Rhombus	Rectangle	Square	Trapezoid

Answer: A

Question 8
Item Type: Multiple Choice Question
Context: Scientific
Competency: Connections and Reasoning and argument
Level of Thinking: Analysing

A sketch of a butterfly is drawn using 2D shapes in the *Figure 5.5.*

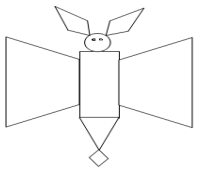


Figure 5.5

How many different types of quadrilaterals are used for creating butterfly?

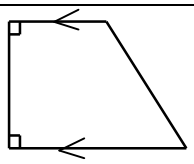
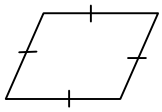
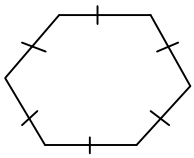
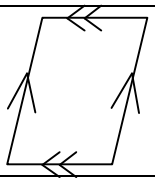
A Three
B Four
C Five
D Six
Answer: B Four

Question 9
Item Type: Multiple Choice Question
Context: Scientific
Competency: Connections and Communication
Level of Thinking: Understanding

Prakash was thinking of a quadrilateral.

- It has no right angle.
- It has four sides of equal length.
- Its opposite side are parallel.

Which of the following could be Prakash's quadrilateral?

			
A	**B**	**C**	**D**

Answer: B

Chapter 2 Polygons and Transformations

Learning Outcome

At the end of the lesson, a student should be able to:

5.2.1 Demonstrate that congruent polygons are perfect match through variety of materials

Question 1
Item Type: Multiple Choice Question
Context: Societal
Competency: Connections
Level of Thinking: Understanding

The  *Figure 5.6* given below is a honeycomb of a bee.

Figure 5.6

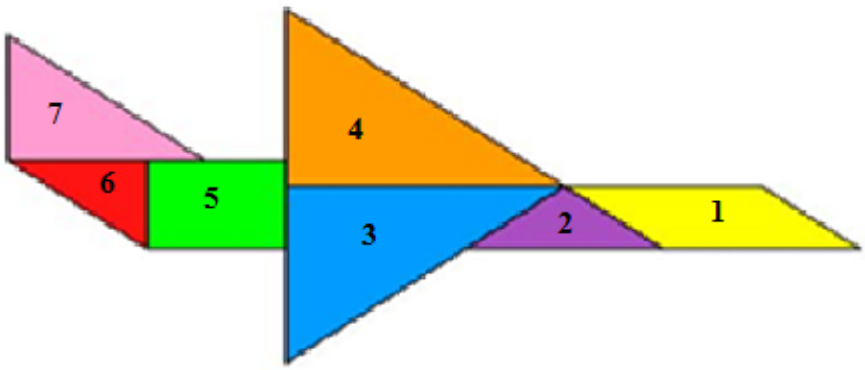
A cell indicated by an arrow in figure 5.6 in the honeycomb above is
A a pentagon.
B a circle.
C a hexagon.
D a square.

Answer: A a pentagon

Question 2

Item Type: Short Answer Question
Context: Scientific
Competency: Representation, Communication and Mathematising
Level of Thinking: Remembering/ Understanding/ Creating

The *Figure 5.7* shows an airplane made from tangram pieces.



a) Name the congruent shapes from the *Figure 5.7.*

Answer: Triangle 3 & 4

b) Identify and draw two trapezoids from the *figure 5.7.*

Answer:

Trapezoid 1: Combination of shape 1 & 2

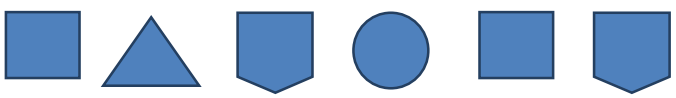
Trapezoid 2: Combination of shape 5 & 6

c) Create one real life object using tans from the figure 5.7.

Sample responses:

Question 3
Item Type: Short Answer Question
Context: Scientific
Competency: Mathematising
Level of Thinking: Understanding

Copy and draw the pair of congruent shapes from the collection below, in the given box.



Learning Outcome
At the end of the lesson, a student should be able to:
5.2.2 Model all possible composite shapes that can be made from given set of figures

Question 1
Item Type: Short answer Question
Context: Societal
Competency: Representation and Connections
Level of Thinking: Remembering
Figure 5.8 is a body of the vehicle with different geometrical shapes as indicated below.

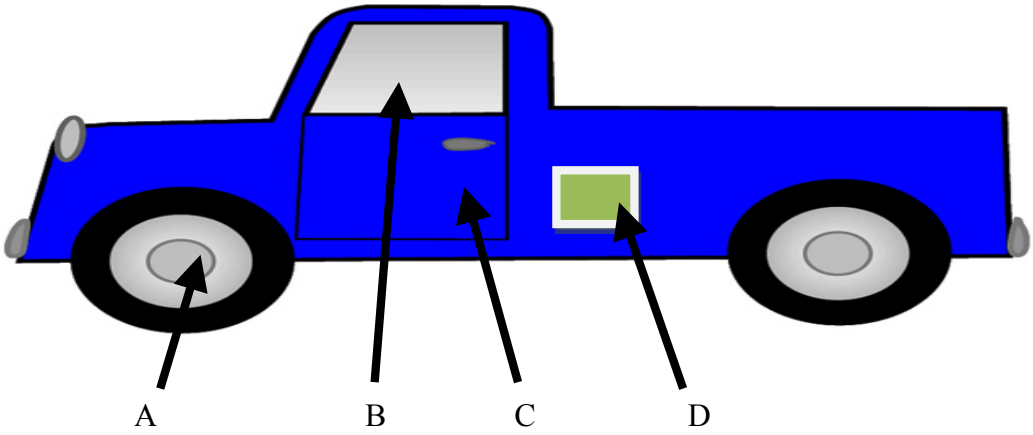


Figure 5.8

Complete the table to label the Figure 5.8. The part A is done for you.

Labels	Name of shape
A	Circle
B	
C	
Combination of B and C	

Answer: B: Trapezoid C: Rectangle Combination of B and C: Pentagon

Question 2

Item Type: Multiple Choice Question
Context: Scientific

Competency: Representation and Connections
Level of Thinking: Applying

Ugyen created a butterfly using 2-D shapes as shown in the *Figure 5.9*

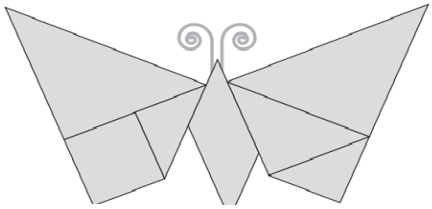


Figure 5.9

What are the appropriate combinations Ugyen used?

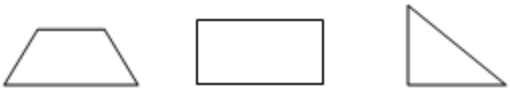
A 5 triangles, 1 square & 1 rectangle
B 5 triangles, 1 Square & 1 Rhombus
C 5 triangles, 1 square & 1 Parallelogram
D 2 triangles, 2 trapezoid & 1 rhombus

Question 3

Item Type: Multiple Choice Question
Context: Scientific
Competency: Representation, Reasoning and argument
Level of Thinking: Analysing

Sonam wants to make a trapezoid using 3 shapes given below. Which shapes should he choose?

A 

B 

C 

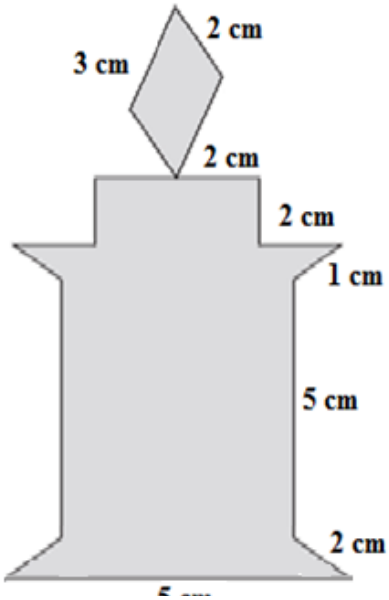
D 

Answer: A

Question 4

Item Type: Long Answer Question
Context: Scientific
Competency: Mathematising
Level of Thinking: Understanding / Applying

Ugyen created a collage using some of the 2-D shapes as shown in the *Figure 5.10.* The measurement of each side is given in centimeters.



a) How many shapes are used to create the *Figure 5.10*
b) Calculate the total perimeter of the *Figure 5.10.*

Figure 5.10

Answer:

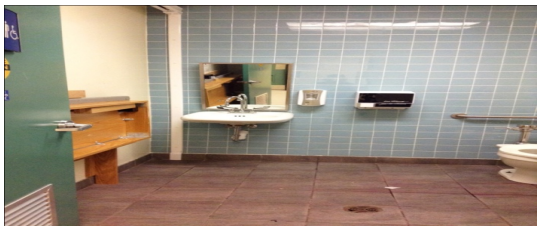
a) 5
b) 43 cm

Question 5

Item Type: Long Answer Question
Context: Personal
Competency: Reasoning and argument, Connections, Communication and Mathematising
Level of Thinking: Evaluating and Creating

Zangmo wants to use with hexagonal shape tiles (Fig. 5.11) in her bathroom floor. The area of the floor is

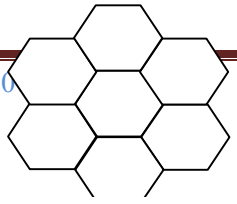
Area of one tiles = 100 sq.cm



bathroom 4000 sq cm.

Figure:5.11

a) Tashi says, 50 tiles are required for Zangmo's bathroom floor. Do you agree, show your work.
b) **Answer**: No, I don't agree with Tashi because $\frac{4000}{100} = 40$ *tiles*
c) Draw a pattern using tiles to show Zangmo's bathroom floor.



Sample Answer:

Question 6

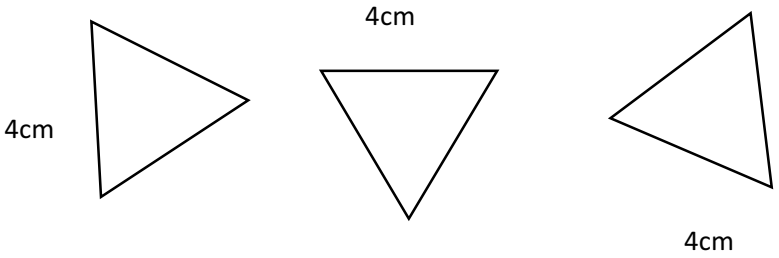
Item Type: Multiple Choice Question
Context: Personal
Competency: Reasoning and argument, Mathematising and communication
Level of Thinking: Evaluating

Karma has tiles that are of different shape and size. He wants puts them together without gaps or overlaps to cover the given shape below. What shape should Karma choose? How do you know?

Answer: He should choose triangle as three triangles can exactly fit inside the given shape.

Question 7

You are given three equilateral triangles.



Create a shape by using the three equilateral triangles. Name the shape.

Learning Outcome
At the end of the lesson, a student should be able to:
5.2.3 Predict and confirm results of flip, slide and turn of 2- D shapes

Question 1
Item Type: Multiple Choice Question
Context: Societal
Competency: Connections
Thinking Skill: Understanding

Study the *Figure 5.11* to answer the following question below.

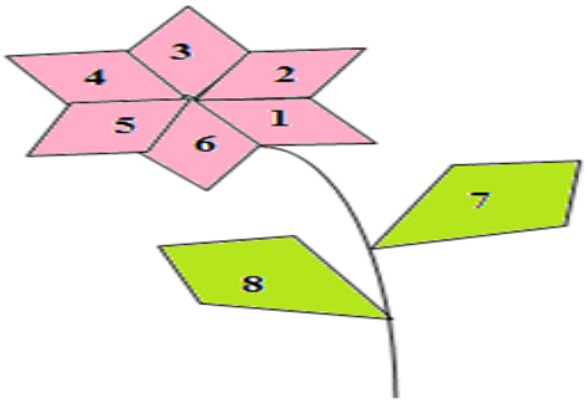


Figure: 5.12

Select a pair which is **NOT** a flip image from the *Figure 5.12.*

A 1 and 4
B 2 and 5
C 3 and 6
D 7 and 8
Answer: D 7 and 8

Question 2
Item Type: Multiple Choice Question
Context: Personal

Competency: Representation
Level of Thinking: Understanding/Understanding/ Applying

Use the *Figure 5.13* to answer the following questions that follow**.**

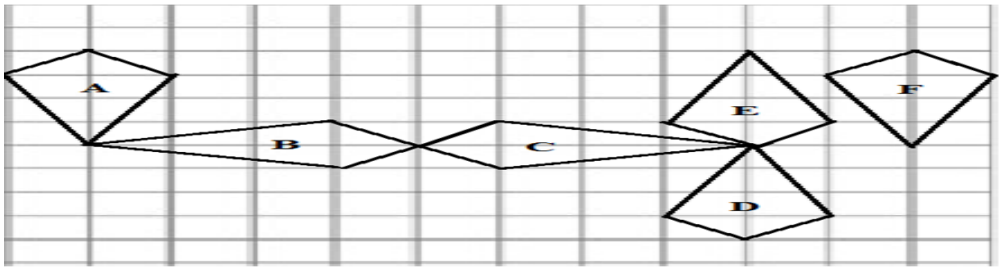


Figure 5.13

a) Which one of the following kites is a flip image of kite A in the *Figure 5.13.*

A Kite B
B Kite C
C Kite E
D Kite F

Answer: D Kite F

b) Choose a pair of kite which are turn images in the *Figure 5.13.*

A Kite A and B
B Kite C and E
C Kite D and E
D Kite E and F

Answer: Kite A and B

c) If kite F is the slide image of kite A, how many spaces has kite A moved?

A 10 spaces left
B 10 spaces right
C 10 spaces up
D 10 spaces down

Answer: B 10 spaces right

Question 3
Item Type: Multiple Choice Question

Context: Personal
Competency: Connections
Level of Thinking: Understanding

Use *Figure 5.14* to answer the question number 4.

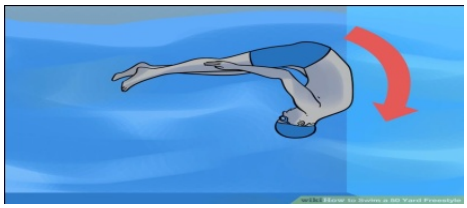


Figure 5.14

The diving made by the swimmer in the *Figure 5.14* is

A $\frac{1}{4}$ turn counterclockwise

B $\frac{1}{2}$ turn counterclockwise

C $\frac{1}{4}$ turn clockwise

D $\frac{1}{2}$ turn clockwise

Answer: C $\frac{1}{4}$ turn clockwise

Question 5

Item Type: Multiple Choice Question
Context: Societal
Competency: Mathematising
Level of Thinking: Applying

Figure 5.15 shows a road with a zebra crossing. If the white line in the middle of the road is the mirror line.

Figure: 5.15

Identify the mirror image of the letters SLOW in the *Figure 5.15*.

A SLOW

B WOLS

C WOJS

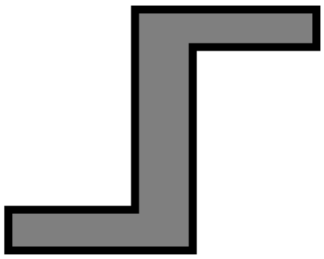
D SOLW

Answer: C WOJS

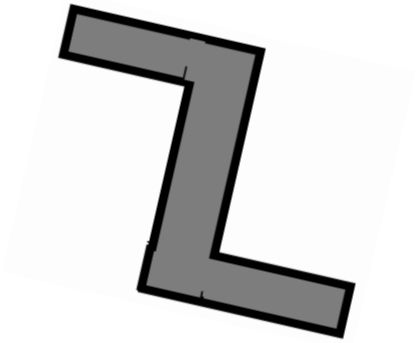
Question 6

Item Type: Multiple Choice Question
Context: Scientific
Competency: Mathematising and Mathematical language and Operation
Level of Thinking: Applying

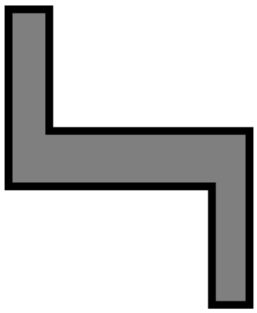
Arjun drew this shape.



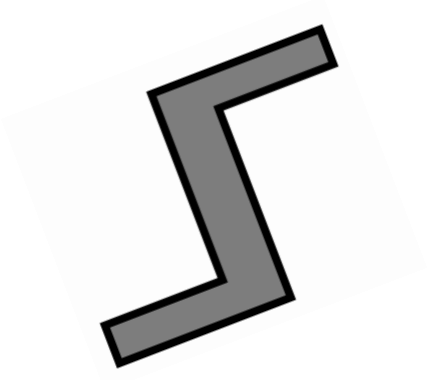
Which of one of these shapes show flip and turn?



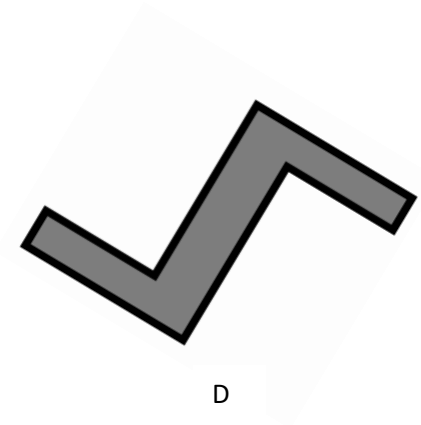
A



B



C



D

Answer: A

Chapter 3 3-D Geometry

Learning Outcome

At the end of the lesson, a student should be able to:

5.3.1 Build shapes (including those with hidden cubes) from an isometric drawing

Question 1
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation
Level of Thinking: Understanding

Figure. 5.16

How many faces and vertices are there in the *Figure 5.16?*

A 6 faces and 12 vertices
B 12 faces and 6 vertices
C 8 faces and 12 vertices
D 12 faces and 8 vertices

Answer: A 6 faces and 12 vertices

Question 2
Item Type: Short Answer Question
Context: Scientific
Competency: Representation

Level of Thinking: Understanding

This 3-D symmetrical object is made by joining cubes. It is then painted.

Figure 5.17

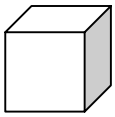
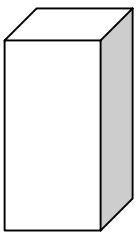
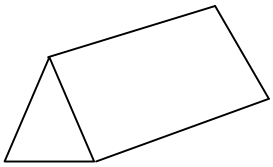
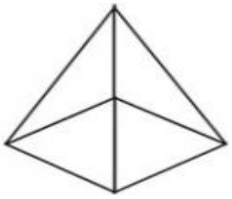
How many faces are painted?

A 9
B 12
C 18
D 24
Answer: C 18

Question 3
Item Type: Multiple Choice Question
Context: Occupational
Competency: Connections
Level of Thinking: Analyzing

Figure 5.18

Karma has 5 pieces of cardboard shown in the *Figure 5.18* above. Which of the following shapes could Karma make using all 5 of these pieces without cutting them?

			
A	B	C	D

Answer: C

Question 5
Item Type: Multiple Choice Question
Context: Personal
Competency: Connections
Level of Thinking: Applying

A baby stacks small boxes in the corner of his playing room. All the boxes are of equal size. How many boxes does the baby use to stack the boxes in the *Figure 5.19.*

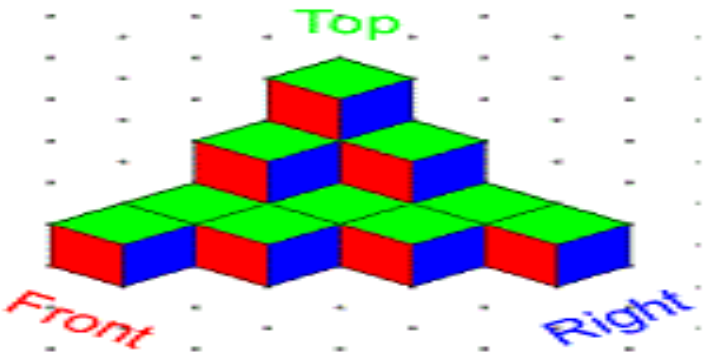


Figure 5.17

A 7
B 10
C 13
D 14
Answer: D 14

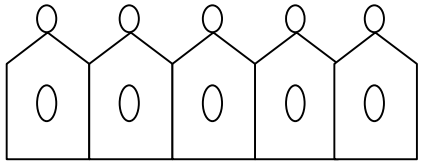
Learning Outcome
At the end of the lesson, a student should be able to:
5.3.2 Draw variety of nets for prisms, pyramids, cylinder and cone

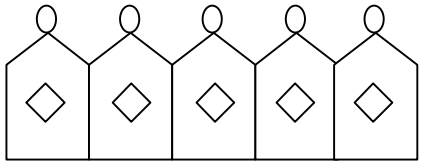
Question 1
Item Type: Multiple Choice Question
Context: Occupational
Competency: Mathematising and Reasoning and argument
Level of Thinking: Analyzing

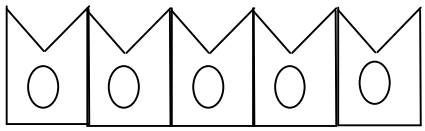

Figure 5.18

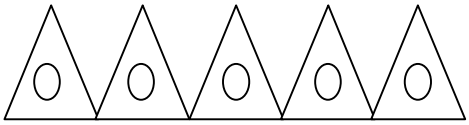
Which of the nets given below matches with the crown given above, in Figure *5.20* .

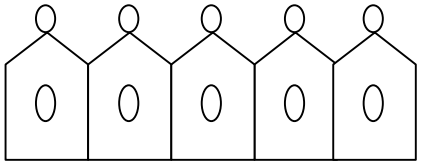
.

A 

B 

C 

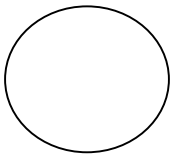
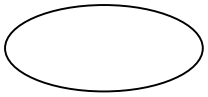
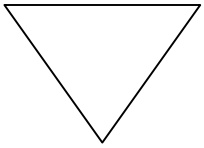
D 

Answer: A 

Question 2
Item Type: Multiple Choice Question
Context: Societal
Competency: Connections and Reasoning and argument
Level of Thinking: Analyzing

Figure 5.21

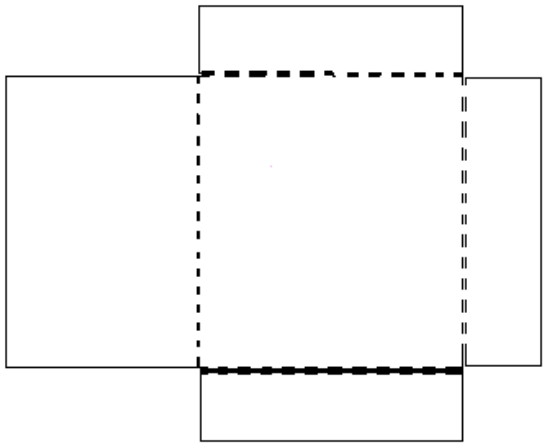
Which among the following shape shows the top view of the cone in the figure 5.21 above ?

			
A	**B**	**C**	**D**

Answer: A

This is a fruity sweet box.

Bijay claims the following diagram as the net of the box above. Do you agree? Explain your thinking with correct net for the above box.



Learning Outcome

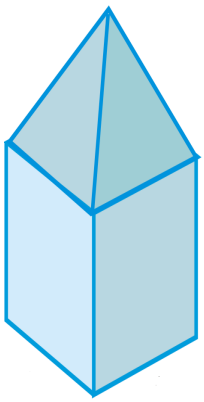
At the end of the lesson, a student should be able to:

5.3.4 Build skeleton models for prisms and pyramids

Question 1
Item Type: Short Answer Question
Context: Scientific
Competency: Representation and Mathematising
Level of Thinking: Creating

a) Design a pencil shaped figure using a square based prism and a square based pyramid.

Answer:



Item Type: Long Answer Question
Context: Personal
Competency: Representation and Mathematising
Level of Thinking: Understanding

b) Complete the table below using pencil shaped figure you created in part a) above. The number of square faces is done for you.

No. of square faces	No. of triangular faces	No. of rectangular faces	No. of edges	No of vertices
1				

Answer:

No. of square faces	No. of Pentagonal shaped faces	No. of rectangular faces	No. of edges	No of vertices
1	4	4	16	9

Question 2

Item Type: Long Answer Question
Context: Personal
Competency: Mathematising
Level of Thinking: Understanding

Figure 5.23 is a house in the form of 3-D shape.

Figure. 5.20

List 3-D shapes that you see in the *Figure 5.23.*

Answer: 1. Rectangular prism.
2. Triangular prism.
3. Cylinder.
4. Hexagonal prism.

Question 2

Item Type: Multiple Choice Question
Context: Personal
Competency: Mathematising
Level of Thinking: Applying

Draw the net of the following 3-D shaped object.

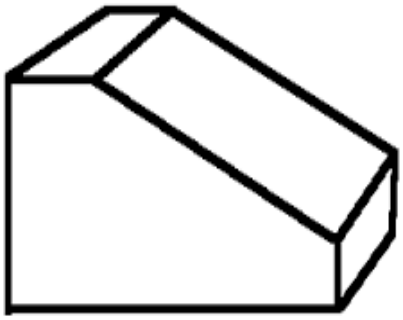
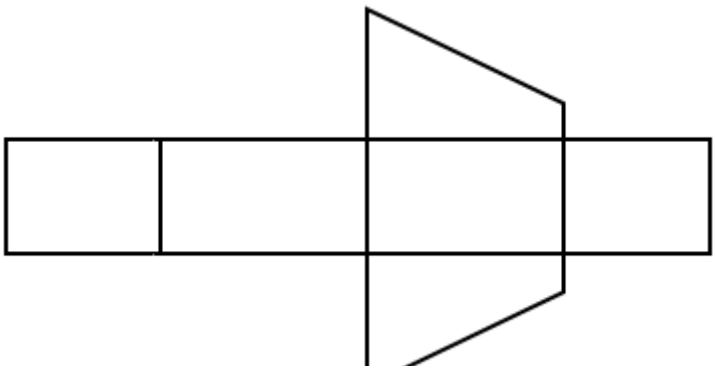


Figure 5.24

Answer:



UNIT 6
FRACTION AND DECIMALS

Chapter 1 Fractions

Learning Outcome

At the end of the lesson, a student should be able to:

6.1.1: Demonstrate that two or more fractions can have different names for same value

Question 1

Item Type: Multiple Choice Question

Context: Personal

Competency: Connections and Using Mathematical language

Level of Thinking: Remembering

Look at the fraction tree below.

1. Which fractions on the fraction tree are equivalent to $\frac{3}{4}$?

A $\frac{4}{8}$ and $\frac{9}{12}$

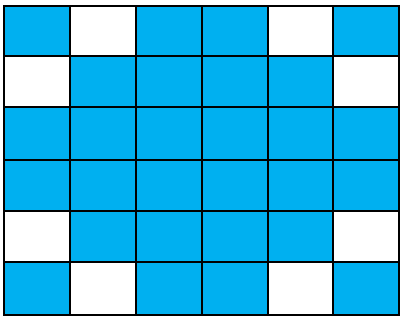
B $\frac{6}{8}$ and $\frac{9}{12}$

C $\frac{4}{8}$ and $\frac{4}{12}$

D $\frac{2}{8}$ and $\frac{8}{12}$

Answer: B $\frac{6}{8}$ and $\frac{9}{12}$

Question 2
Item Type: Multiple Choice Question
Context: Scientific
Competency: Representation
Level of Thinking: Applying



What is the simplest form of the shaded portion?

A $\frac{3}{9}$

B $\frac{4}{3}$

C $\frac{2}{3}$

D $\frac{9}{12}$

Answer: C $\frac{2}{3}$

Question 3
Item Type: Short Answer Question
Context: Personal
Competency: Reasoning and Argument and Representation
Level of Thinking: Evaluating

Dorji says TWO numbers given are equal. Do you agree with him? Justify with diagram.

$\frac{17}{4}$ and $4\frac{1}{4}$

Learning Outcome
At the end of the lesson, a student should be able to:
6.1.2: Model equivalent fractions and find number pattern in them

Question 1
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation
Level of Thinking: Understanding

What fractions do each figure 6.1 represent?

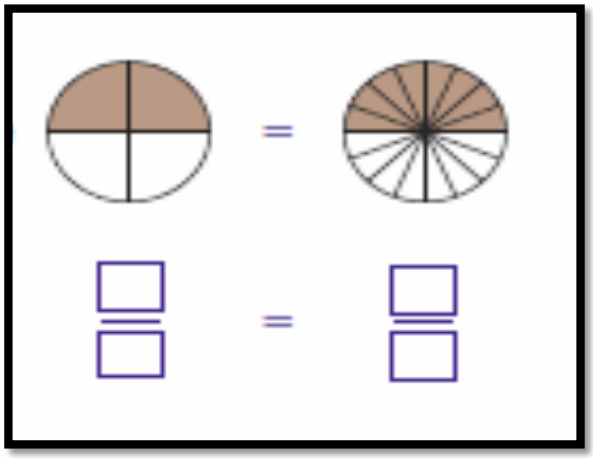


Figure: 6·1

A $\frac{1}{4} = \frac{4}{16}$

B $\frac{2}{4} = \frac{8}{16}$

C $\frac{3}{4} = \frac{12}{16}$

D $\frac{4}{4} = \frac{16}{16}$

Answer: B $\frac{2}{4} = \frac{8}{16}$

Question 2
Item Type: Multiple Choice Question
Context: Scientific
Competency: Representation
Level of Thinking: Applying

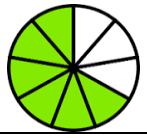
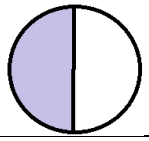
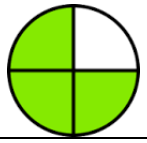
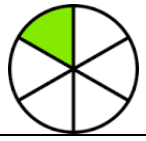
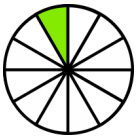
A		
B		
C		
D		

Figure: 6.2

1. Which pair is an equivalent fraction in *Figure 6.2*?

Answer: A

Question 3
Item Type: Multiple Choice Question
Context: Personal
Level of Thinking: Analyzing
Competency: Reasoning and Argument and Connections
What is the correct fraction for the pattern given below?

$$\frac{1}{3} = \square = \frac{5}{15} = \frac{7}{21} = \frac{9}{27}$$

A $\frac{1}{9}$
B $\frac{2}{9}$
C $\frac{3}{9}$
D $\frac{4}{9}$

Answer: C $\frac{3}{9}$

Question 4
Item Type: Long Answer Question
Context: Occupational
Level of Thinking: Analyzing
Competency: Mathematising and Reasoning and argument and Communication

Tshering baked cake 'A'. She used $\frac{3}{9}$ cups of flour and sugar. Dolma baked cake 'B' with $\frac{2}{6}$ cup of same ingredients. Who baked the bigger cake? Show your work.

Cake 'A' Cake 'B'

Answer: Cake A and B are of same size. Amount of ingredient Tshering used is equal to 3/9 = 1/3 and Dolma used 2/6 of same ingredient = 1/3. Therefore, 3/9= 2/6.

Learning Outcome
At the end of the lesson, a student should be able to:
6.1.3: Compare and order fractions using various strategies

Question 1
Item Type: Multiple Choice Question
Context: Personal
Level of Thinking: Understanding
Competency: Connections

Kelzang is comparing two fractions. What number should he write in the box to fit comparisons rule?

$$\frac{\quad}{8} > \frac{4}{8}$$

A 2
B 3
C 4
D 5

Answer: D 5

Question 2
Item Type: Multiple Choice Question
Context: Societal
Level of Thinking: Understanding
Competency: Using mathematical language and operation

Jigme's car occupies an area of $\frac{7}{8}$ sq meters while Yeshey's car occupies $\frac{6}{5}$ sq meters. Which sign is appropriate to use to describe whose car occupies more space?

$$\frac{7}{8} \square \frac{6}{5}$$

A <
B >

C =
D ≤

Answer: A < Jigme car Yeshey car

Question 3
Item Type: Multiple Choice Question
Context: Societal
Level of Thinking: Analyzing
Competency: Reasoning and argument, Communication and Problem solving

Nima, Dawa, Karma and Mindu bought 2 pizzas of the same size. Nima ate $\frac{2}{4}$ of a pizza. Dawa, karma and Mindu ate $\frac{1}{4}$ of a pizza each. How much pizza is left?

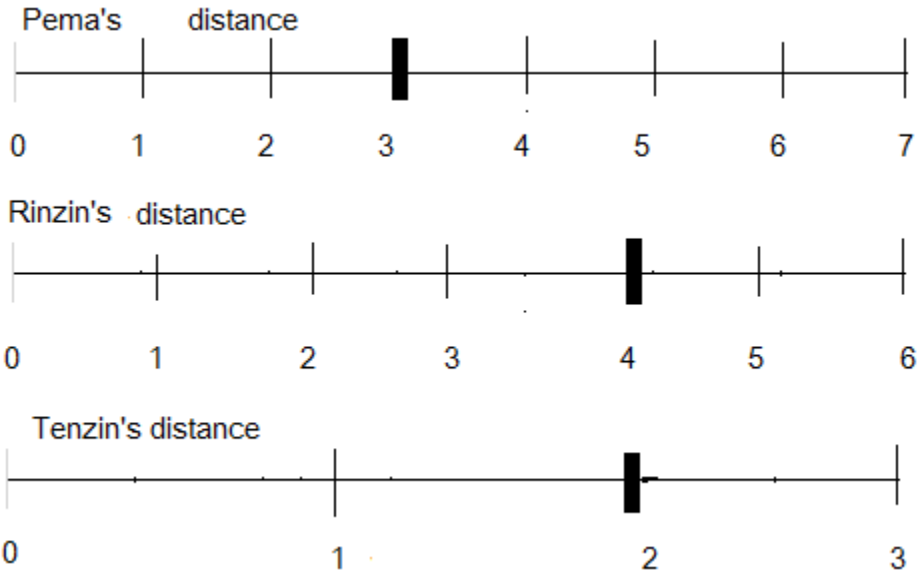
A $\frac{1}{4}$ of a pizza
B 1 pizza
C $\frac{1}{2}$ of a pizza
D $\frac{3}{4}$ of a pizza

Answer: C $\frac{3}{4}$ of a pizza

Question 4
Item Type: Short Answer Question
Context: Societal
Level of Thinking: Analysing
Competency: Reasoning and argument, Communication, Problem solving and Connections

Pema walks a distance of $\frac{3}{7}$ km to the school from his home. Rinzin walks $\frac{4}{6}$ km and Tenzin walks $\frac{2}{3}$ km. Compare and order the distance from nearest to furthest.

Answer:



$\frac{3}{7} < \frac{4}{6} = \frac{2}{3}$.

Learning Outcome

At the end of the lesson, a student should be able to:

6.1.4: Model mixed numbers using various representations (paper strip, number line and picture)

Question 1
Item Type: Multiple Choice Question
Context: Personal
Level of Thinking: Understanding
Competency: Representation

Namgay stood first in beaker filling race during the sports day. The figure 6.3 represents the fraction of beakers filled. What fraction of beakers did Namgay fill?

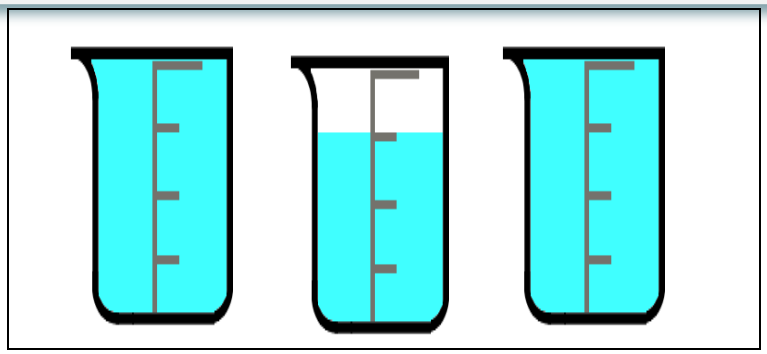


Figure: 6.3

A $2\frac{1}{4}$

B $2\frac{2}{4}$

C $2\frac{3}{4}$

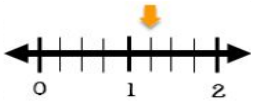
D $2\frac{4}{4}$

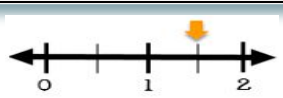
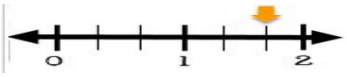
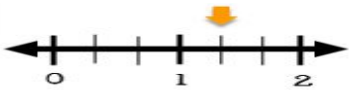
Answer: C $2\frac{3}{4}$

Question 2
Item Type: Multiple Choice Question
Context: Personal
Level of Thinking: Applying
Competency: Representation

Which number line is $1\frac{1}{4}$?

A



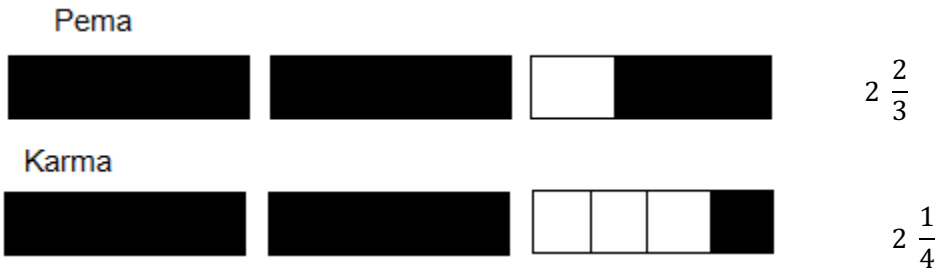
B	
C	
D	

Answer: A

Question 3
Item Type: Long Answer Question
Context: Personal
Level of Thinking: Evaluating
Competency: Reasoning and argument, Communication and Problem solving

Pema ate $2\frac{2}{3}$ plates of momo. Karma ate $2\frac{1}{4}$ plates. Who ate more momos? Justify and Show your work.

Answer:



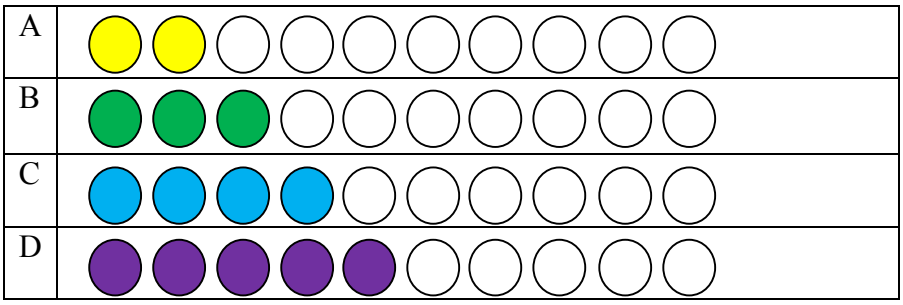
Pema ate more than Karma as shown in the diagram above.

Learning Outcome
At the end of the lesson, a student should be able to:
6.2.1: Relate fractions and decimals using tenths and hundredths

Question 1
Item Type: Multiple Choice Question

Context: Societal
Level of Thinking: Understanding
Competency: Representation

Kuendrel painted his room in this pattern. Which shaded part of the diagram is 0·4?

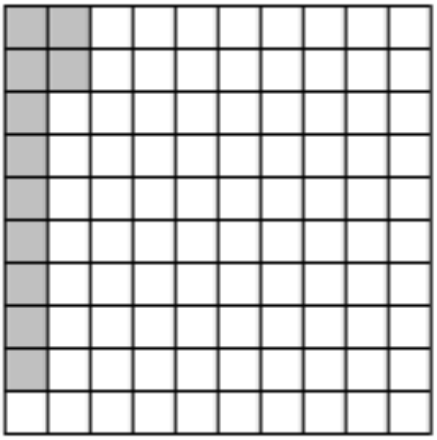


Answer: C

Question 2
Item Type: Multiple Choice Question

Level

Context: Personal
of Thinking: Applying
Competency: Representation



Which number best describes the *Figure 6.4*?

Figure: 6.4

A 0.10
B 0.11
C 0.12

D 0.13

Answer: B 0.11

Question 3
Item Type: Multiple Choice Question
Context: Societal
Level of Thinking: Analysing
Competency: Connections

1. Look at *Figure 6.5*.

Figure: 6.5

If the insect walks 0.7 cm further, where will its nose be?

A 1.1 cm
B 1.2 cm
C 1.3 cm
D 1.4 cm

Answer: C 1.3 cm

Question 4
Item Type: Short Answer Question
Context: Scientific
Level of Thinking: Applying
Competency: Using Mathematical tools

Write the mass of each item shown in *Figure 6.6*.

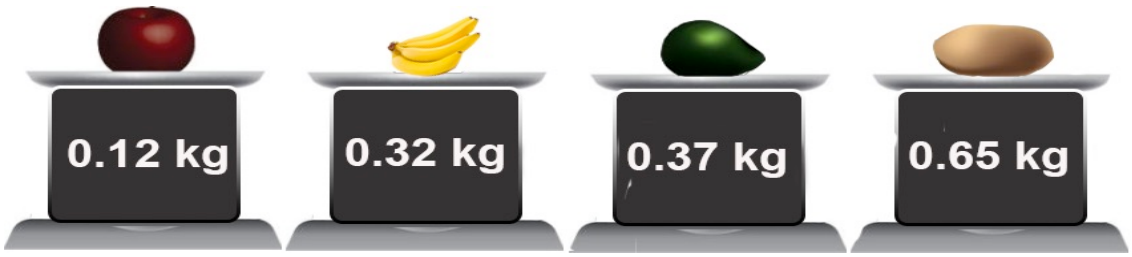


Figure: 6.6

i. Write the mass of each item on the place value chart.

Items	Tenths	Hundredths
Apple		
Banana		
Avocado		
Potato		

ii. Arrange the mass from greatest to lowest.

Items	Tenths	Hundredths
Apple	1	2
Banana	3	2
Avocado	3	7
Potato	6	5

Answer:

i.

ii. Arrange mass form greatest to lowest: 0.65 kg > 0.37 kg > 0.32 kg > 0.12 kg

---

Learning Outcome

At the end of the lesson, a student should be able to:

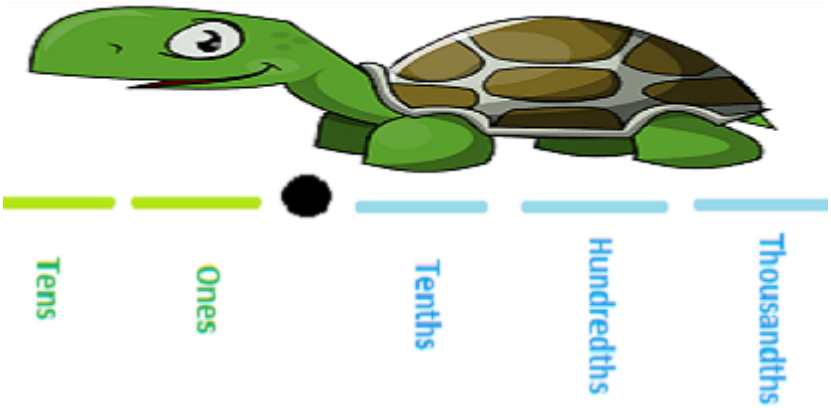
6.2.2: Demonstrate an understanding of decimal tenths and hundredths in the place value system

Question 1

Item Type: Multiple Choice Question

Context: Societal
Level of Thinking: Understanding
Competency: Representation

One of the students from Sarpang said, turtle is one of the slowest reptiles. It walks 4.567 kilometres in an hour.



Which place does its hand falls?

A Tens
B Ones
C Tenths
D Hundredths

Answer: C Tenths

Question 2
Item Type: Multiple Choice Question
Context: Societal
Level of Thinking: Applying
Competency: Representation

Tom can drink 5.2 L of milk. Jerry can drink 3.9 L less milk than Tom.

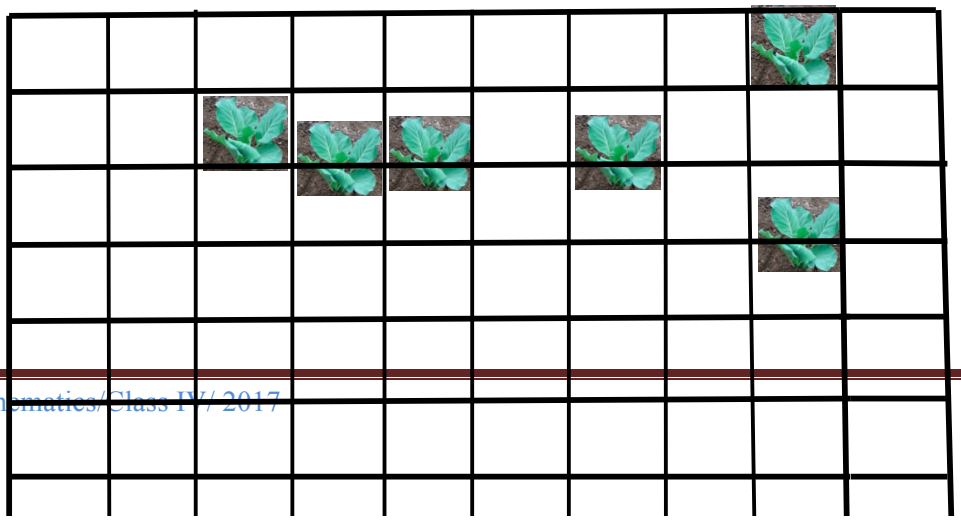
How many litres of milk does Jerry drink?

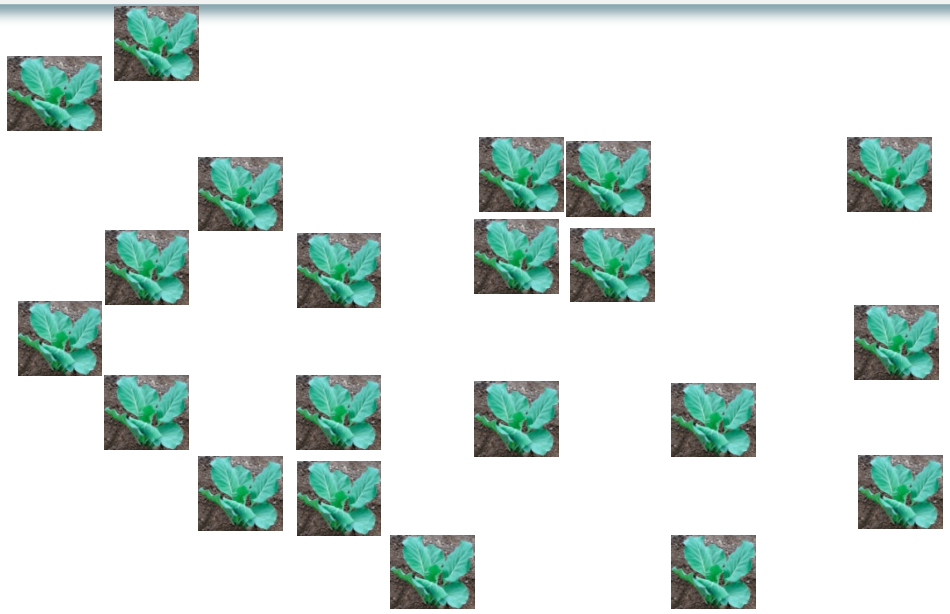
A 1.1 L
B 1.2 L
C 1.3 L
D 1.4 L

Answer: C 1.3 L

Question 3
Item Type: Multiple Choice Question
Context: Occupational
Level of Thinking: Applying
Competency: Representation

Deki is planting spinach in 10×10 plot garden. The shaded area shows the part of plantation.





How much garden is used for the spinach plantation?

A 0.27
B 27
C 2.7
D 7

Answer: A 0.27

Learning Outcome
At the end of the lesson, a student should be able to:
6.2.3: Compare and order decimals using various strategies

Question 1
Item Type: Multiple Choice Question
Context: Scientific
Level of Thinking: Analysing
Competency: Reasoning and argument and Using mathematical tools

The thermometers below show different readings.

Arranged the temperatures from the warmest to the coldest?

A 98.4, 36.6, 75.3, 66.6

B 98.4, 37.0, 75.3, 66.6

C 98.4, 75.3, 37.0, 66.6

D 66.6, 37.0, 75.3, 98.4

Answer: C 98.4, 75.3, 37.0, 36.6

Question 2
Item Type: Short Answer Question
Context: Societal
Level of Thinking: Analyzing
Competency: Representation

Five runners have entered into a competition. Four of the runners completed their race in 9.45mins, 9.49mins, 9.50mins, and 9.51mins.

If the fifth runner wins the race, what would be his completion time?

A 9.43 mins

B 9.45 mins

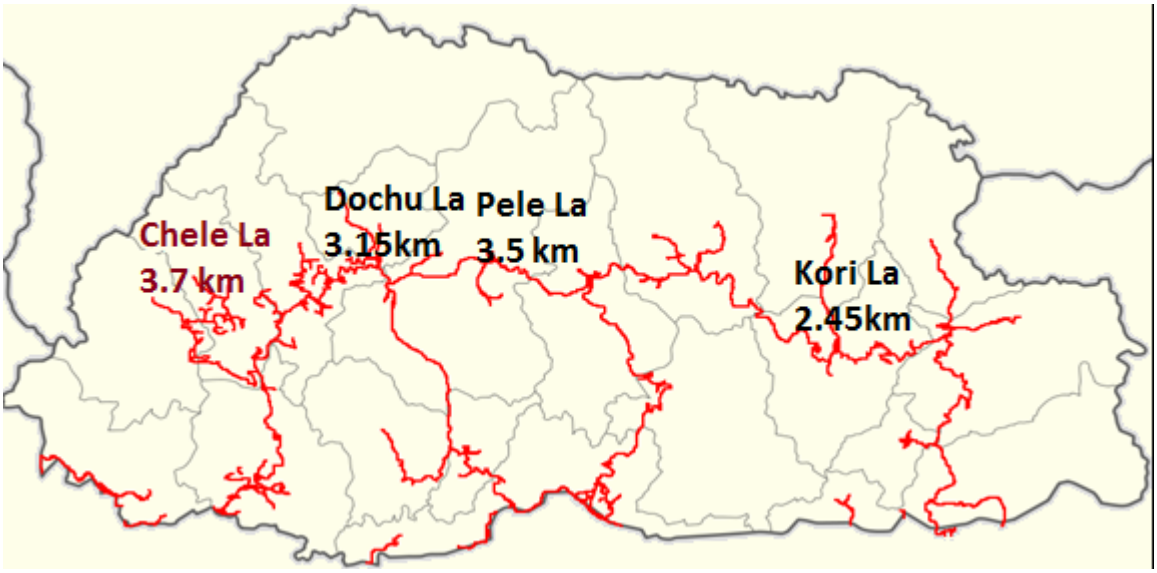
C 9.49 mins

D 9.51 mins

Answer: A 9.43 mins

Question 3
Item Type: Short Answer Question
Context: Societal
Level of Thinking: Analysing
Competency: Reasoning and argument, Connection and Communication

The altitude of the different passes of Bhutan from the sea level is given in the map.



Answer the questions:

i. How much more is the altitude of Chele La than Kori La?
ii. Arrange the passes in the decreasing order of its altitudes.

Answer:

i. Altitude of Chele La is 3.7 – 2.45 = 1.25 km
ii. Arrangement of passes: Chele La > Pele La > Dochu La > Kori La

Question 4
Item Type: Short Answer Question
Context: Societal
Level of Thinking: Applying
Competency: Problem solving and Communication

Bhutan and Maldives are about the same size. The population of Bhutan in the year 2016 was 0.79 million and that of Maldives was 0.39 million.

i. Which country has more number of people living in it?

ii. What is the difference between the populations of two countries?

Answer:

i. Bhutan
ii. Difference in population : 0.79 – 0.39 = 0.4m

Learning Outcome
At the end of the lesson, a student should be able to:
6.2.4: Add and subtract decimals using different strategies

Question 1
Item Type: Multiple Choice Question
Context: Occupational
Level of Thinking: Applying
Competency: Problem solving and Connections

A swimmer in a 100 metre race swims the first half of the race in 32.34 seconds. He swims second half of the race in 34.83 seconds. How long did he take complete the race?

A 67.15 seconds

B 67.16 seconds

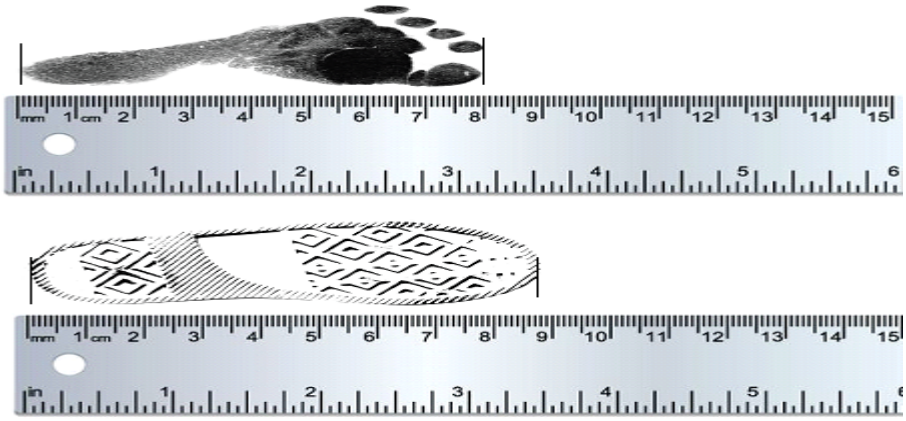
C 67.17 seconds

D 67.18 seconds

Answer: C 67.17 seconds

Item Type: Multiple Choice Question
Context: Personal
Level of Thinking: Applying
Competency: Representation and Problem solving
Question 2

Yoezer measured his footprint. He then measured his shoe print.



How much longer is his shoe than his foot?

A 0.08 cm
B 0.8 mm
C 8 mm
D 8 cm

Answer: C 8 mm

Question 3
Item Type: Multiple Choice Question
Context: Societal
Level of Thinking: Applying
Competency: Representation and Problem solving

Choney has these many coins.

What is the total amount?

A Ch 125
B Ch 100
C Ch 95
D Ch 85

Answer: B Ch. 100

Item Type: Question answer
Context: Personal
Level of Thinking: Applying
Competency: Connections and Problem solving
Question 4

Rinzin and Tenzin were drinking hot water. The temperature of Rinzin's hot water was 53.9 degree celsius. The temperature of Tenzin's hot water was 16.2 degrees celsius less. How hot is Tenzin's water?

Answer: 53.9 – 16.2 = 37.7 degree Celsius

UNIT 7
DATA AND PROBABILITY

Chapter 1 Collecting and Displaying Data

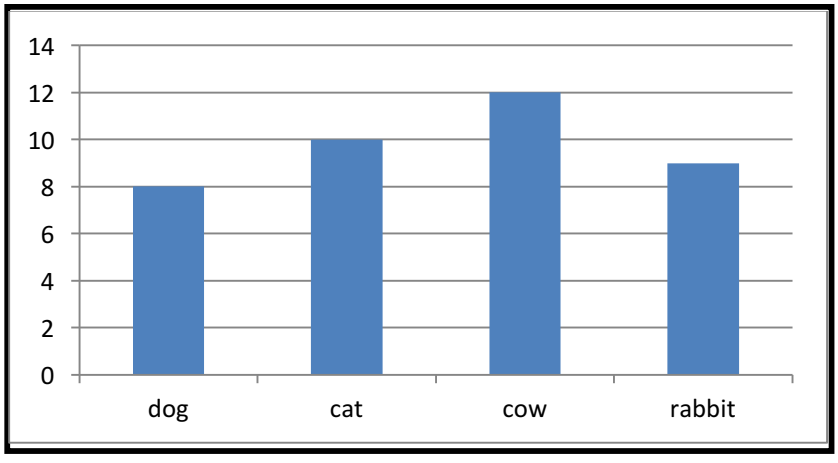
Learning Outcome

At the end of the lesson, a student should be able to:

7.1.1 Recognize and a use variety of methods to collect, organize and describe data.

Question 1
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation and Communication
Level of Thinking: Understanding

The Figure 7.1 shows the favourite animals of class four students.



(Figure 7.1)

i) How many student had the favourite animals in the class?

A 30
B 33
C 35

D 39

Answer: D 39

ii) How many more students like cow than rabbit?

A 1
B 2
C 3
D 4

Answer: C 3
Question 2
Item Type: Long Answer Question
Context: Personal
Competency: Reasoning and argument, Communication and Representation
Level of Thinking: Analyzing

The *Figure 7.2* shows the number of ice cream cones sold each day on one weekend.

Ice Cream Cones Sold	
Friday	
Saturday	
Sunday	

Figure 7.2

Each  means 5 ice cream cones

How many more ice cream cones were sold on Saturday than on other two days? How do you know?
Answer: Number of ice cream cones sold on Saturday = 5 * 5 = 25. Number of ice cream cones sold on other days = (3+1) * 5= 20. Therefore, 25- 20 = 5 more ice cream was sold on Saturday.

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation, Mathematical language and Operations
Level of Thinking: Understanding

Study the *Figure 7.3* below.

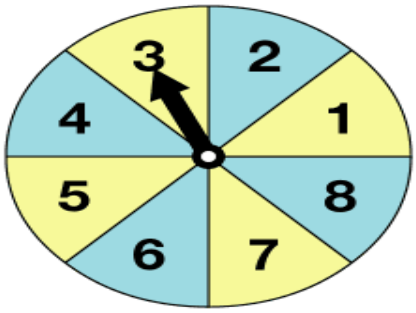


Figure 7.3

What is the probability of getting an even number?

A $\frac{2}{8}$
B $\frac{4}{8}$
C $\frac{1}{8}$
D $\frac{3}{8}$

Answer: B $\frac{4}{8}$

Question 4
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation, Mathematising and Communication
Level: Understanding

Wangmo collected data about favorite sports of her classmates. She displayed the information using a bar graph as shown in the Figure 7.4.

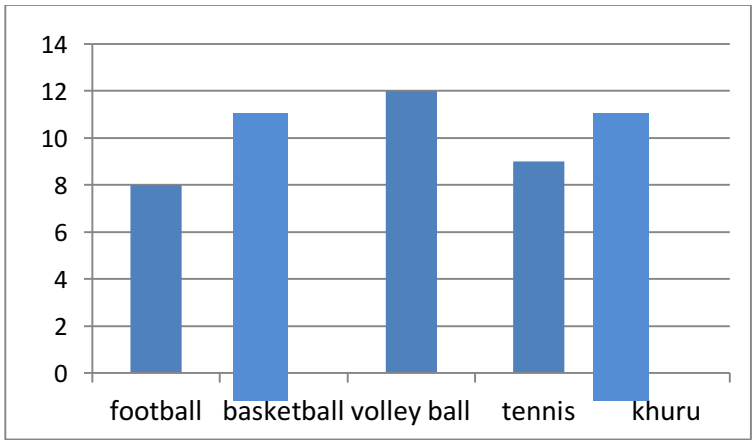


Figure 7.4

Which of the following would you suggest Wangmo to make the bar graph correct?

A change the scale
B keep equal gap between each bar
C height of the bars should be same
D shade the bars with different colours

Answer: B keep equal gap between each bar

Question 5
Item Type: Multiple Choice Question
Context: Personal
Competency: Communication
Level of Thinking: Understanding

Maya wants to find an average age of students in her class. The best method she can use is by

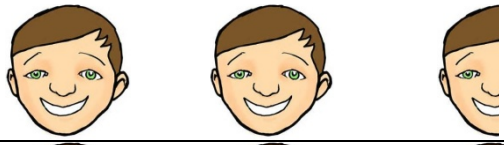
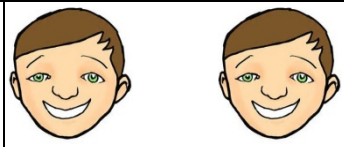
A asking only few students.
B asking half of the students.

C asking whole students.
D asking to her friends only.

Answer: C asking whole students

Question 6
Item Type: Short Answer Question
Context: Societal
Competency: Representation, Mathematical language and tools
Level of Thinking: Creating

Figure 7.5 shows the favourite sports of class 5 students

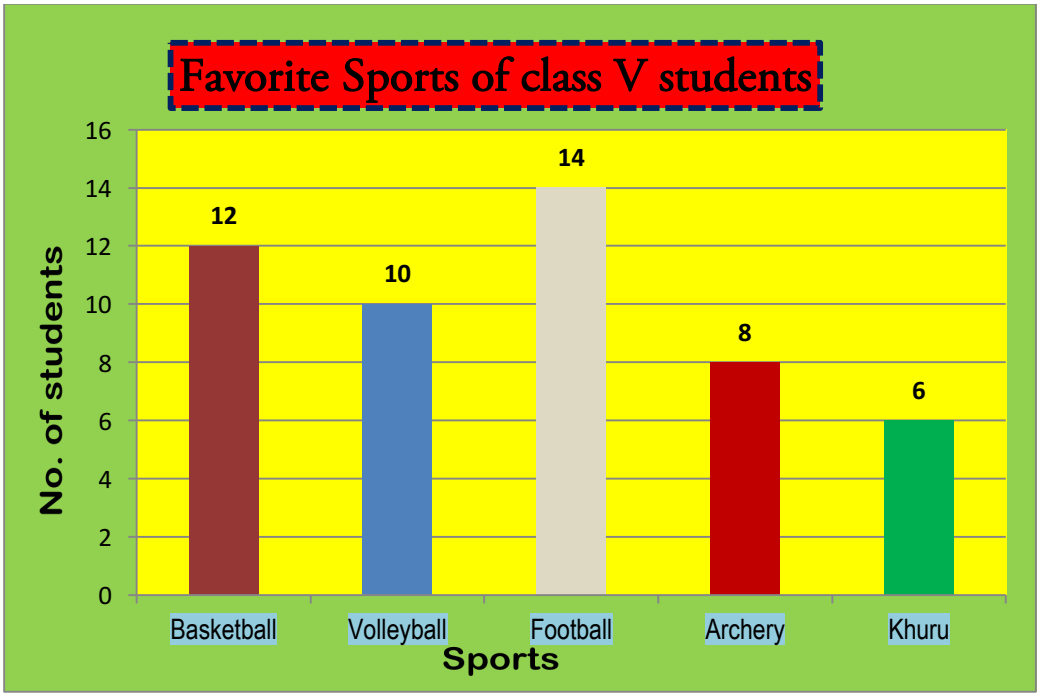
Sports	Number of students
Basketball	
Volleyball	
Football	
Archery	
Khuru	

(Figure 7.5)

Each  means 4 students

Draw a graph to show the above information using different scale.

Solution: sample response



Learning Outcome

At the end of the lesson, a student should be able to:

7.1.2 Read and interpret data from bar graph and pictograph

Question 1
Item Type: Multiple Choice Question
Context: Scientific
Competency: Representation and Connections
Level of Thinking: Understanding
Figure 7.6 shows the amount of rainfall (mL) in one year.

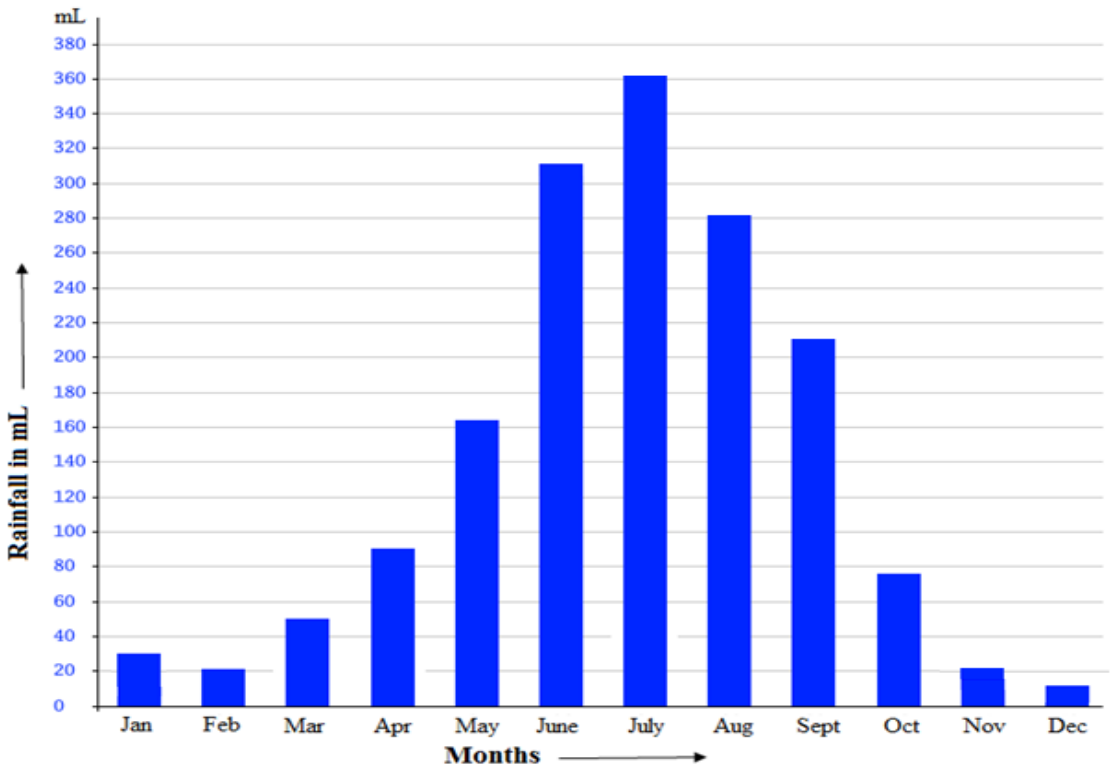


Figure 7.6

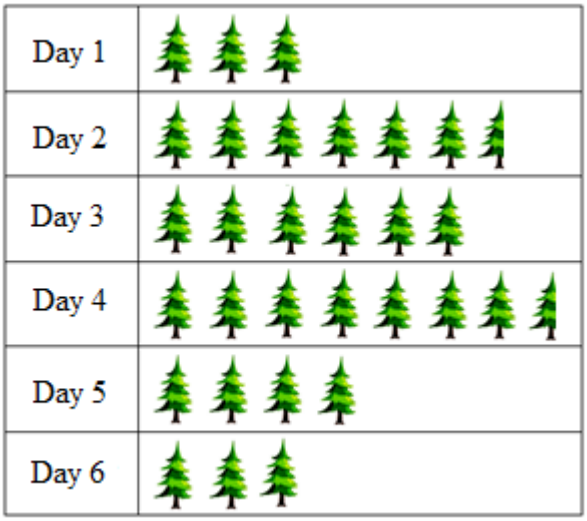
The difference between his highest and lowest yearly rainfall is

A 360 mL
B 350 mL
C 300 mL
D 10 mL

Answer: B 350 mL

Question 2
Item Type: Multiple Choice Question
Context: Societal
Competency: Problem Solving, Connections and Representation
Level of Thinking: Applying

Different numbers of plants were planted by the students of a school on six days of a week. This is shown in the Figure 7.6 below.



→ Each  represents 6 plants

Figure 7.6

The number of saplings planted during the week is
A 30
B 180

C 186
D 174

Answer: B 180

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation
Level of Thinking: Applying

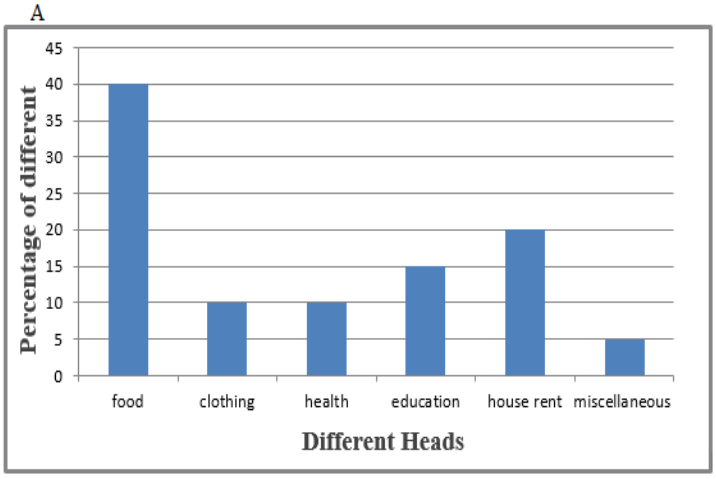
The percentage of total income spent under various heads by a family is given in Figure 7.7

Different Heads	Food	Clothing	Health	Education	House Rent	Miscellaneous
% of different incomes	40%	10%	10%	15%	20%	5%

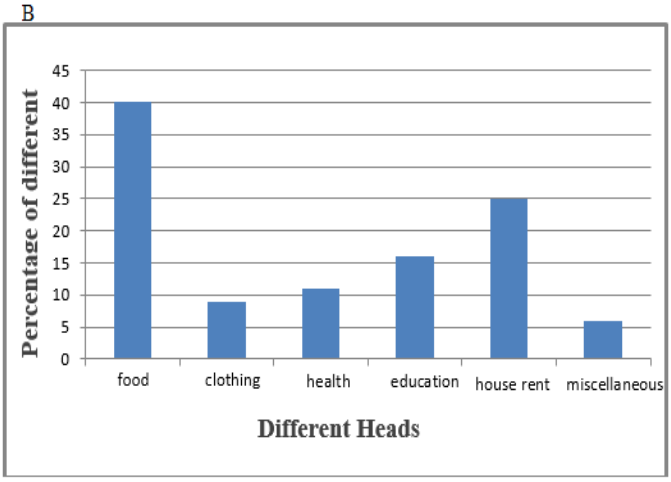
Figure 7.7

Which of the following graph best represent the above data?

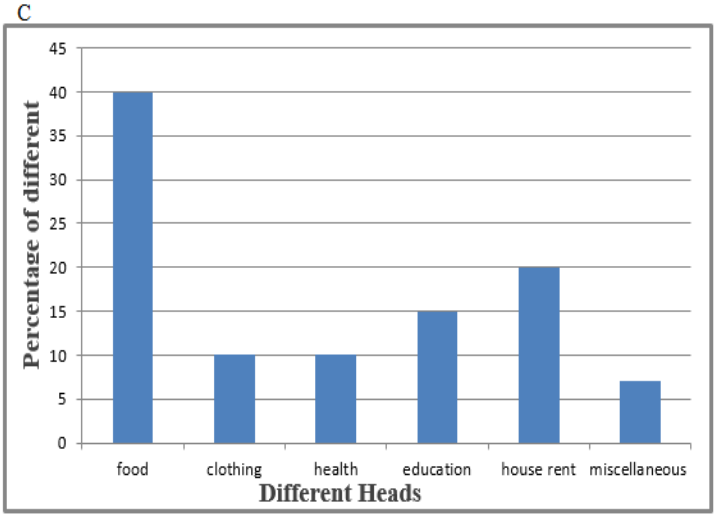
A



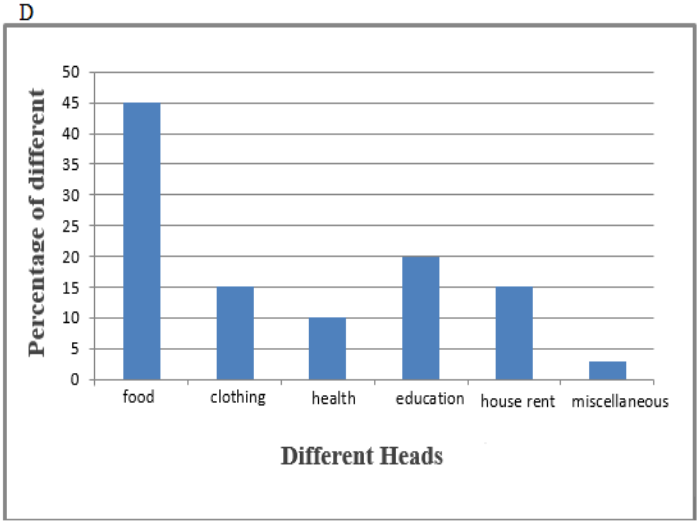
B



C



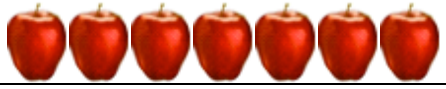
D



Answer: A

Question 4
Item Type: Multiple Choice Question
Context: Societal
Competency: Reasoning and argument, Problem solving and Communication
Level of Thinking: Analyzing

The *Figure 7.8* below shows different types of fruits purchased by Tshering's family.

Types of fruits		Total cost
Oranges		Nu 30
Apples		Nu 49

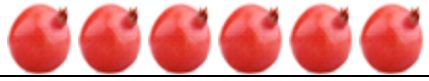
Pears		Nu 60
Strawberries		Nu 18
Pomegranates		Nu 48

Figure 7.8

Which fruits can you buy with Nu 30, so that you can share one fruit each among six friends?

A Pomegranates
B apple and strawberries
C pears
D oranges

Answer: C pears

Question 5
Item Type: Multiple Choice Question
Context: Scientific
Competency: Reasoning and argument, Connections and Mathematical language
Level of Thinking: Analyzing

The Figure 7.9 shows the amount of sugar in six different foods. Health officials advise people not to take more sugar as it is not good for health.

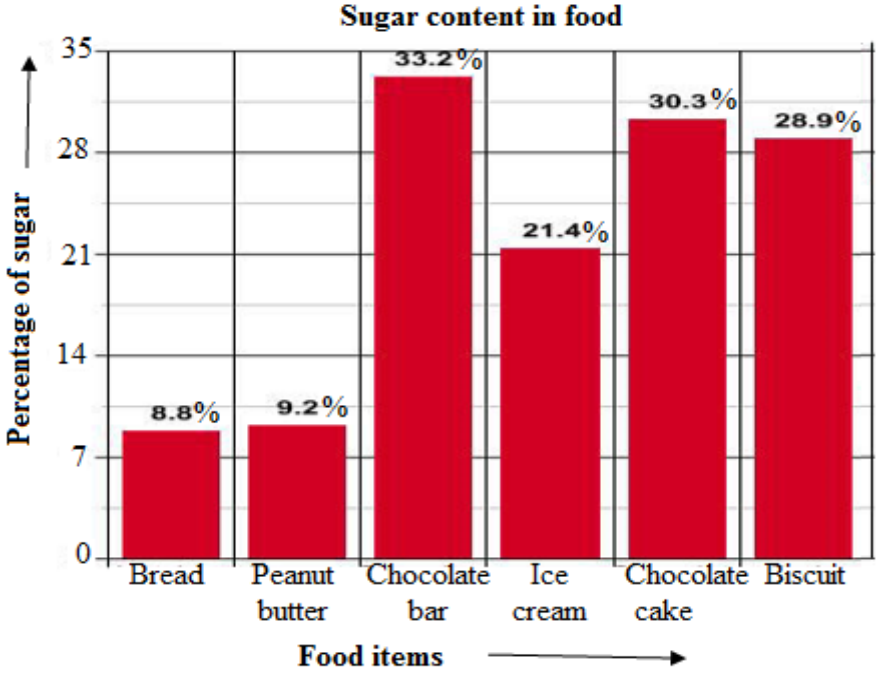


Figure 7.9

Looking at the figure 7.9, Dawa arranges the type of foods that are less harmful and more harmful to our health as shown below. Which arrangement is correct?

A	Bread	Ice cream	Peanut butter	Chocolate cake	Biscuits	Chocolate bar
B	Bread	Peanut butter	Chocolate cake	Biscuits	Ice cream	Chocolate bar
C	Bread	Chocolate cake	Ice cream	Peanut butter	Biscuits	Chocolate bars
D	Bread	Peanut butter	Ice cream	Biscuits	Chocolate cake	Chocolate bar

Answer:

D	Bread	Peanut butter	Ice cream	Biscuits	Chocolate cake	Chocolate bar

Learning Outcome
At the end of the lesson, a student should be able to:
7.1.3 Display position on a coordinate grid using ordered pairs

Question 1
Item Type: Multiple Choice Question
Context: Societal
Competency: Mathematical language, Mathematical tools and Connections
Level of Thinking: Understanding

Sonam used the map with coordinate grid as shown in Figure 7.10 *to* get the exact location of a place.

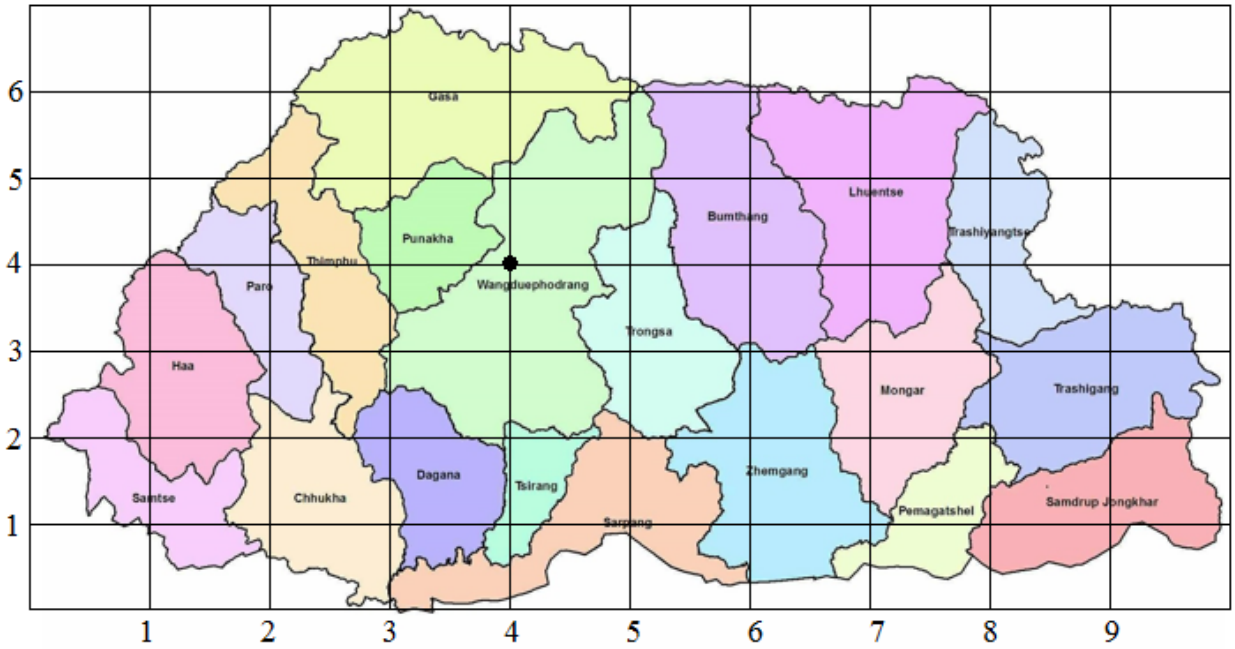


Figure 7.10

The location of Wangdue Phodrang is

A (4, 3)
B (3, 4)
C (3, 3)
D (4, 4)

Answer: D (4, 4)

Question 2
Item Type: Multiple Choice Question
Context: Societal
Competency: Representation and Problem Solving
Level of Thinking: Applying

A group of villagers plan to make a vegetable garden using the shape derived from the points **A** (3, 4), **B** (6, 4), **C** (4, 6), and **D** (5, 6). What will be the shape of the garden?

A square
B trapezoid
C rectangle
D parallelogram

Answer: B trapezoid

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Problem Solving
Level of Thinking: Understanding

Four different fruits are located on the different point of a Figure 7.11.

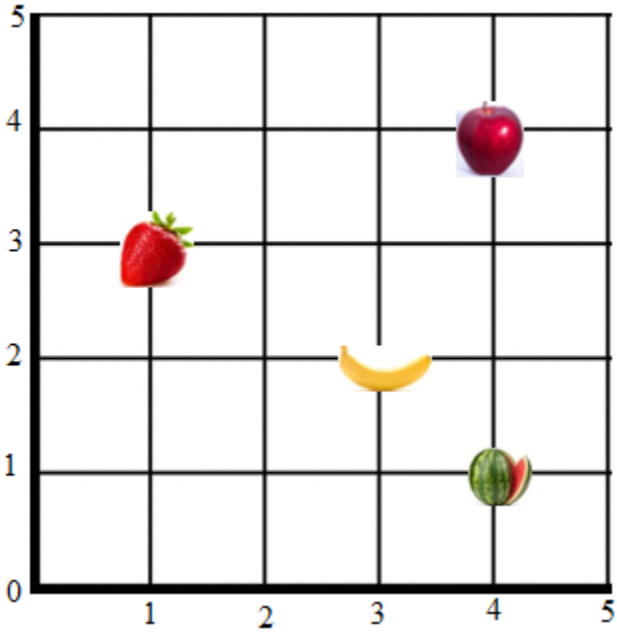


Figure 7.11

The correct ordered pairs of each fruit is

A	(4,4)	(1,3)	(3,2)	(4,1)
B	(4,1)	(1,3)	(3,2)	(4,0)
C	(4,2)	(3,1)	(2,3)	(4,2)

D	 (4,3)	 (1,3)	 (3,2)	 (4,3)

Answer:

A	 **(4,4)**	 **(1,3)**	 **(3,2)**	 **(4,1)**

Question 4
Item Type: Multiple Choice Question
Context: Occupational
Competency: Connections, Mathematical language and tools
Level of Thinking: Analyzing

The *Figure* 7.12 below shows the amount of time spent in the office and at home by different groups of people.

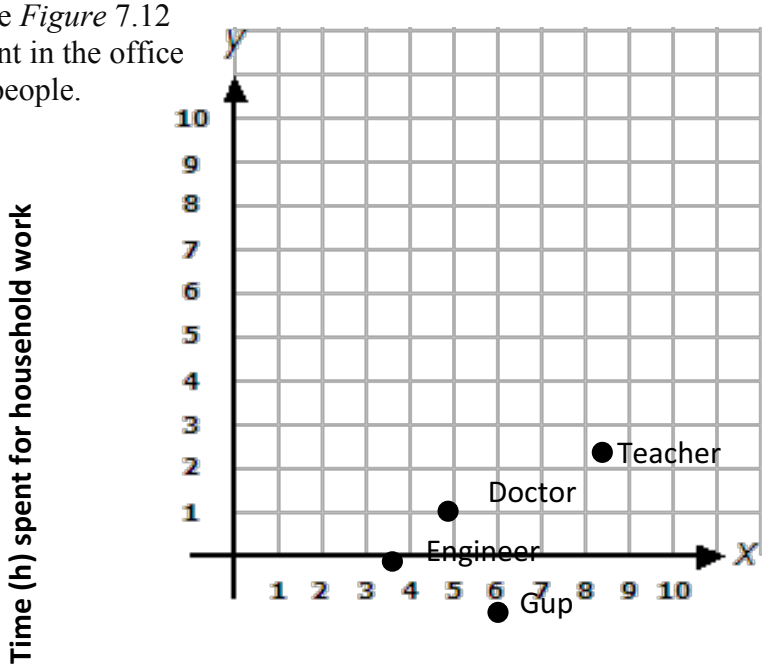


Figure 7.12

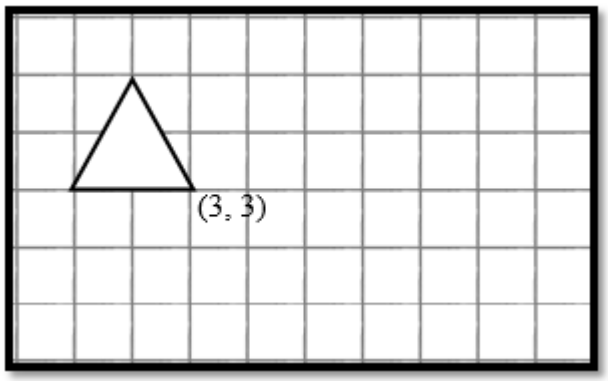
How much more time is spent by a teacher than a doctor in the office?

A 1 hour
B 3 hours
C 5 hours
D 9 hours

Answer: B 3 hours

Question 5
Item Type: Multiple Choice Question
Context: Personal
Competency: Problem Solving and Representation
Level of Thinking: Applying

Study the *Figure 7.13*. Slide the shape to 3 units right.



(Figure 7.13)

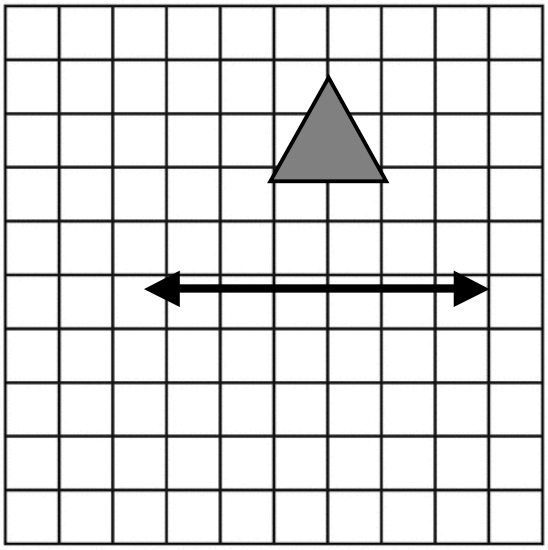
Where are the vertices of an image?

A (6,3), (4,3), and (5,5)
B (6,3), (4,3), and (2,5)
C (6,3), (6,4), and (5,5)
D (3,6), (6,4), and (5,5)

Answer: A (6,3), (4,3), and (5,5)

Question 6
Item Type: Short Answer Question
Context: Personal
Competency: Reasoning and argument, Representation and using mathematical language
Level of Thinking: Evaluating

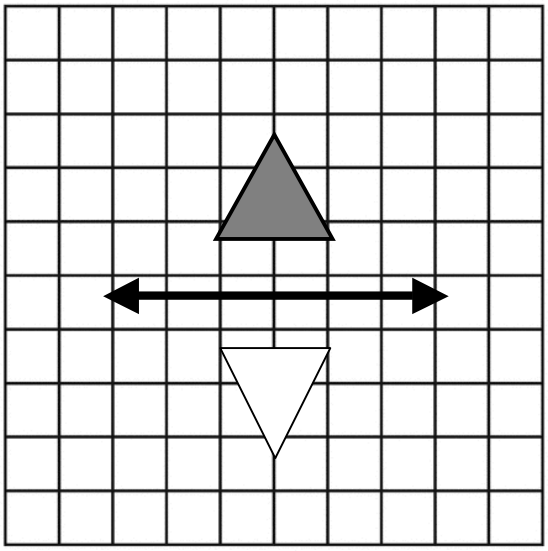
Dechen plotted the ordered pairs (4,4), (5,2), and (6,4) and flipped it along the mirror line as shown in *Figure7.14*



(Figure 7.1)

Do you agree with the image Dechen got? Give reason to support your answer.

Solution:



No. When the shape is reflected along the mirror line, the image will be one unit away from the mirror line with the ordered pairs at (4,6), (6,6), and (5,8) and not on (4,7), (6,7), and (5,9).

Learning Outcome
At the end of the lesson, a student should be able to:
7.1.4 Describe mean, maximum, minimum, range and frequency of a group of data

Question 1
Item Type: Multiple Choice Question
Context: Scientific
Competency: Connections and Reasoning and argument
Level of Thinking: Analyzing

The table below *Figure7.14* shows annual average temperature of eight Dzongkhags.

TEMPERATURE ^{0}F												
	Jan/Feb		Mar/Apr		May/Jun		Jul/Aug		Sep/Oct		Nov/Dec	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Paro	55.4	37.4	59	37.4	73.4	55.4	77	59	71.6	50	53.6	37.4
Thimphu	57.2	32	60.8	42.8	71.6	57.2	80.6	62.6	68	55.4	60.8	33.8
Punakha	64.4	44.6	75.2	48.2	71.6	50	78.8	55.4	77	51.8	71.6	48.2
Wangdi	62.6	44.6	75.2	51.8	82.4	64.4	84.2	68	78.8	62.2	71.6	44.6
[illegible]												
Trongsa	53.6	33.8	60.8	35.6	68	57.2	64.4	57.4	62.6	55.4	60.8	48.2
Bumthang	50	33.8	60.8	41	64.4	50	69.8	55.4	66.2	51.8	59	35.6
Mongar	73.4	50	80.6	51.8	86	68	95	71.6	86	64.4	77	46.4
Trashigang	60.8	39.2	66.2	44.6	68	55.4	71.6	57.2	68	51.8	60.8	48.2

Figure 7.14

The difference between the maximum temperature of Paro and Trongsa in the month of September /October is

A 6.1 ^{o}F.
B 7.0 ^{o}F.
C 7.2 ^{o}F.
D 9 ^{o}F.

Answer: D 9 ^{o}F

Question 2
Item Type: Multiple Choice Question
Context: Personal
Competency: Connections and Problem solving
Level of Thinking: Understanding

Four friends do a temporary job of picking oranges during the winter vacation. The *Figure 7.15* below shows number of oranges collected in one day.

Name	Number of oranges (Kg)
Karma	18
Kinley	11
Wangmo	15
Sushma	12

Figure 7.15

On an average, how many oranges did they pick in one day?

A 56
B 13
C 18
D 14

Answer: D 14

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Connections and Problem Solving
Level of Thinking: Analyzing

Sonam is studying in Class III. The Figure 7.16 below represents marks scored in her unit test.

Subjects	Marks(out of 10)
English	5
Maths	7
Dzongkha	?
EVS.	6
Science	7

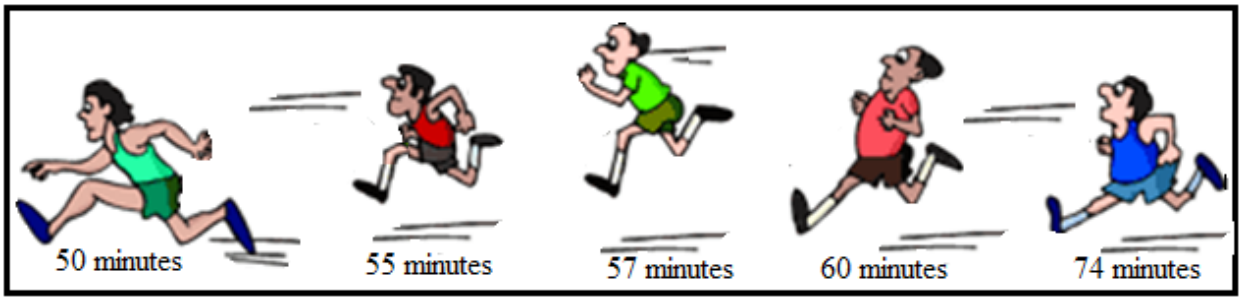
Figure 7.16

If her mean mark is 6, what will be her score in Dzongkha?

A 4
B 5
C 6
D 20
Answer: B 5

Question 4
Item Type: Multiple Choice Question
Context: Societal
Competency: Connections
Level of Thinking: Understanding

In an annual school marathon race, 5 participants completed the race. What is the range of time taken to complete the race?



A 19 minutes
B 24 minutes
C 17 minutes
D 14 minutes

Answer: D 14 minutes

Question 5
Item Type: Multiple Choice Question
Context: Societal
Competency: Connections and Problem solving
Level of Thinking: Analyzing

A group of people from city corporation Phuntsholing, went around the town to find out how many parking spaces each house has. Here are the results given in *Figure 7.17*

Parking Spaces	Number of house
2	12
3	15
5	8
6	9

*Figure 7.*17

If each house has a car, how many more parking spaces will be required?

A 10
B 11
C 12
D 44

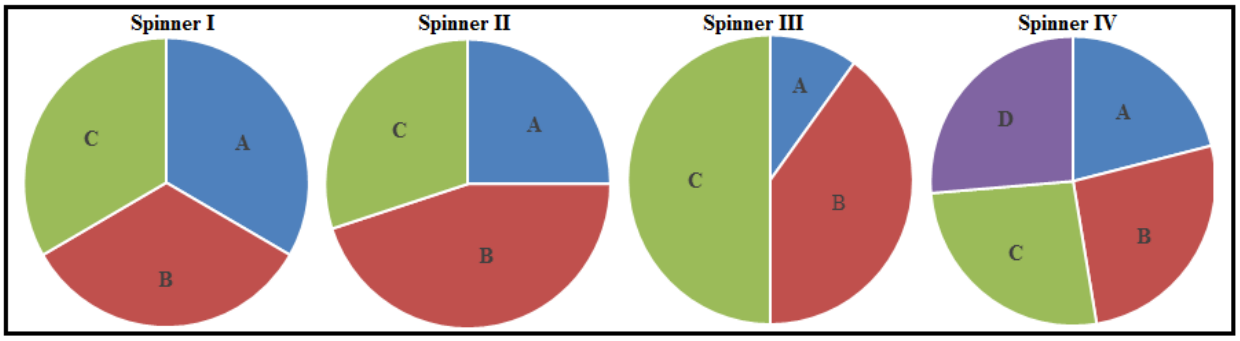
Answer: B 11

Chapter 2 Exploring Probability

Learning Outcome
At the end of the lesson, a student should be able to:
7.2.1 Predict whether an outcome is more or less likely than another

Question 1
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation and Mathematical tools
Level of Thinking: Understanding

Figure 7.18 shows four spinners.



(Figure 7.18)

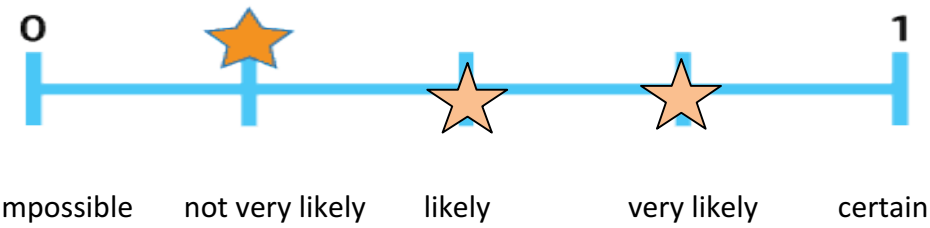
What is the probability of winning if Pema choses Part A in spinner I?

A not very likely
B likely
C very likely
D certain

Answer: C likely

Question 2
Item Type: Multiple Choice Question
Context: Societal
Competency: Connection and Mathematical language and tools
Level of Thinking: Understanding

What is the probability of the lion to escape from the zoo?



A impossible
B not very likely
C likely
D very likely

Answer: B not very likely

Question 3
Item Type: Multiple Choice Question
Context: Personal
Competency: Representation and Mathematical language
Level of Thinking: Understanding

Sonam picks a tile from a set of tiles shown below.

What is the probability of getting a letter after **B**?

A Likely
B Unlikely
C Very likely
D Very unlikely

Answer: C very likely

Question 4
Item Type: Multiple Choice Question
Context: Occupational
Competency: Reasoning and argument and Connections
Level of Thinking: Analyzing

Four teams participated in an open khuru tournament organized by the school. The results of the first round is shown below *Figure 7.19*

Team	**Score**
Team A	3 kareys
Team B	5 kareys

Team C	4 kareys
Team D	2 kareys

Figure 7.19

Predict which team has more chances of hitting kareys if they take same shots in the second round

A Team A
B Team B
C Team C
D Team D
Answer: B **Team B**

Question 5
Item Type: Multiple Choice Question
Context: Societal
Competency: Reasoning and argument, Representation and Connections
Level of Thinking: Analyzing

The *Figure 7.20* shows fines for breaking traffic rules.
Major Traffic Violations for November, 2016 (RSTA)

SL.NO.	Offence Name	Fine amount	Total Offence
1	Double parking	Nu 550	25
2	Not following duty of the driver	Nu 750	20
3	Obstruction of Traffic	Nu 750	20
4	Unsafe overtaking	Nu 600	18
5	Stopping on middle of road	Nu 550	17

(Figure 7.20)

Which offence has a probability of $\frac{1}{4}$?

A Not following general duty of the driver
B Stopping on middle of road
C Unsafe overtaking
D Double parking
Answer: D Double parking

Learning Outcome
At the end of the lesson, a student should be able to:
7.2.2 Predict probability of an event as either near to 0, 1 or near to $\frac{1}{2}$

Question 1
Item Type: Multiple Choice Question
Context: Personal

Competency: Connections
Level of Thinking: Understanding

Phuntsho and Yangzom are playing a snake game. They roll a die to move to next step.

What is the chance of getting a number to climb a ladder?

A Near to 0

B Near to $\frac{1}{2}$

C Near to 1

D Between $\frac{1}{2}$ and 1

Answer: A Near to 0

Question 2
Item Type: Short Answer Question
Context: Personal
Competency: Connections
Level of Thinking: Understanding

Direction: Match each item given in column A with the correct item given in column B.

Column A	Column B

i) A baby born is a boy	a) certain
ii) Lifespan of a dog is 30 years.	b) 50%
iii) Rolling a die and getting number 5	c) $\frac{3}{10}$
iv) Most of the class four students are 10 or 11 years old	d) Never happen
v) Some of the students in the school are left handed	e) $\frac{1}{6}$
vi) Spinning a spinner of 10 equal sectors and getting an even number less than 7	f) likely
	g) 25%

Question 3
Item Type: Short Answer Question
Context: Personal
Competency: Connections
Level of Thinking: Understanding

Directions: Fill in the blanks with the correct answer given in the bracket

i. A probability of **1** means that the event to occur is **……** (certain/very likely)

ii. Probabilities of events can be described in a **range of…… (0 to** $\frac{1}{2}$ / 0 to 1).

iii. The probability of an event can **never be ……..**(less than 1 / less than 0)

Answer: i. certain
ii. 0 to 1
iii. less than 0

Question 4
Item Type: Long Answer Question
Context: Personal
Competency: Reasoning and argument and Communication
Level of Thinking: Evaluating

Figure 7.22 shows results of a badminton tournament participated by four people.

Name	Wins	Losses	Total games
Karma	5	3	8

Arjun	4	4	8
Kinley	6	2	8
Wangmo	2	6	8

Figure 7.22

i) Predict and write down which player won exactly $\frac{1}{4}$ of the games. Calculate to check your prediction.

Solution:

$Probability = \frac{Number\ of\ games\ won}{Total\ games}$

Karma $= \frac{5}{8}$

Arjun $= \frac{4}{8}$

Kinley $= \frac{6}{8}$

Wangmo $= \frac{2}{8}$

Therefore, Wangmo won exactly $\frac{1}{4}$ of the games**.**

Learning Outcome
At the end of the lesson, a student should be able to:
7.2. 3: Describe probability using fractions

Question 1
Item Type: Short Answer Question
Context: Personal
Competency: Connections, Reasoning and argument and Communication
Level of Thinking: Evaluating

Figure 7.21 shows the number of balls in the container.

Container	Number of balls
Blue	7
Green	4

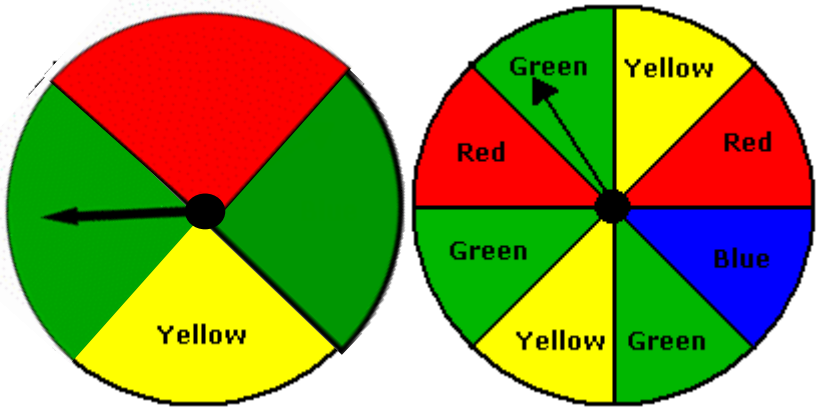
Figure 7.21

Galey says that the probability of taking out a blue ball at random from the container is $\frac{7}{11}$ and Ganesh says it is $\frac{4}{11}$. Who is correct?

Solution: Galey is correct as there are 7 blue balls in the container and the probability of taking out blue ball is 7 out of 11.

Question 2
Item Type: Short Answer Question
Context: Personal
Competency: Reasoning and argument Communication and Mathematical tools
Level of Thinking: Evaluating

Pema says that there are more chances of spinner A, landing on green, whereas Tashi says that spinner B has more chances.



Spinner A Spinner B

Who do you think is correct? Explain your thinking.

Solution (sample response)
Pema is correct, since

$$\frac{2}{4} > \frac{3}{8}$$

Question 3
Item Type: Long Answer Question
Context: Personal
Competency: Communication, Mathematising and Mathematical language and tools
Level of Thinking: Creating
Kezang is an average student studying in class four. She wants to know more on probability words **(very likely and likely)** with fractions. Write down two events that can help to solve her problem.

Solution: Sample response:

Probability words	Events	Fractions
Very likely	Going to school in a week(In a week there are 6 school going days out of seven days)	$\frac{6}{7}$
Likely	Rolling a die and getting a number greater than 2. (so number greater than 2 are 3,4,5, and 6)	$\frac{4}{6}$

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