



Holiday Homework CLASS –VII

Subject English

SUBJECT ENRICHMENT ACTIVITIES

(in subject enrichment copy for the written work)

1. Write two stories of your own
2. Write five poems that you like the most
3. Write two poems of your own
4. Write ten amazing facts about Squirrels and ants.
5. Paste/draw the picture of a Desert and write a paragraph on DESERT AND THE LIFE IN A DESERT
6. Read English news paper, magazines,comics, story books every day.
7. Listen to English news atleast ten to twenty minutes.
8. Write one page in the handwriting copy everyday(2/5/23 to20/6/23)

IN HOMEWORK COPY

- 1.Which part of the story,"The Three Questions" do you like the most and why?
- 2.Write a paragraph on " Homeworks are highly beneficial for the students"
- 3.Describe the squirrel and paste the related photos/ draw it.
4. Write ten amazing facts about Elephants

Subject- Science

1. Riddles:

Solve each of the following riddles by writing the name of the organism and its mode of nutrition.

- (a) I am tall but I cannot move. I am green and can prepare my own food. _____
- (b) I live in water; people keep me in an aquarium and feed me. _____
- (c) I am small and I can fly. I disturb your sleep, bite you and suck your blood which is my food. _____
- (d) I am white and soft. I grow well in the rainy season. Children pluck me from the ground and admire me. I absorb nutrients from decomposed dead parts of plants and animals in the soil. _____

2. Project work:

Make a model of the human digestive system (out of waste materials/Clay/any other material). (Suggested size is A4 Size)

3. CCT QUESTIONS

Complete the Competency based questions send in whats app group (Only write the answers)

4. Index/Flash card:

Prepare a flash card on different modes of nutrition with the pictures of one or two examples of each



Ex:

5. Extra questions

Complete the NCERT exemplar questions sent in WhatsApp group. only write down the answers.

6. Multi Disciplinary Project

Theme: Games and Sports

Topic: Integration of science and sports

Suggested Activities:

- (i) To find different science phenomena used in sports. (Ex- Friction, speed, gravitation etc)
- (ii) Measurements: Can write the measurement (Length) of pitch, field, weight of ball used for different sports, Speed etc)
- (iii) Why we breath faster after running or playing.
- (iv) Types of motion you can see in different types of sports.

* (These are only the suggested Activities, you can add the topics on your own, Must add the related pictures, the pages for science should be 3 to 4)

विषय - हिंदी

1. पाठ - 1 'हम पंछी उन्मुक्त गगन के' और पाठ - 2 'हिमालय की बेटियां, याद करें ।
2. कोई भी एक हिंदी कविता तथा कोई एक हिंदी कहानी याद करें । (कविता 1-3 मिनट और कहानी 2-3 मिनट)

3. निबंध लिखें :-

क. कोशिश करने वालों की हार नहीं होती।

ख. मन के हारे हार , मन के जीते जीत । (150 शब्द)

4. अपने और अपने माता-पिता के बीच कम से कम 20 वाक्यों में संवाद लिखिए ।
5. अपने छोटे भाई या बहन को साफ़ -सफ़ाई का महत्व बताते हुए पत्र लिखिए ।
6. आपकी छुट्टियों के केवल 15 दिनों की डायरी लिखिए । (कोई भी 15 दिन)
7. पाठ्यपुस्तक से द्वंद समास के 10 उदाहरण खोजकर लिखिए।
8. बाल महाभारत की कथा के आधार पर भीष्म की विशेषताएं लिखिए ।
9. नदियों से हमें क्या क्या लाभ होते हैं 10 पंक्तियां लिखिए ।
10. निम्नलिखित फ़िल्में देखिए और उनसे मिलने वाली पाँच प्रमुख शिक्षाएँ लिखिए :-

i :- <https://youtu.be/gZy4vIGf7MY>

I am kalam

ii :- <https://youtu.be/CPXkijYI9Y0>

Chalk n duster

iii :- <https://youtu.be/a1G1Sg3-g2g>

Taare zameen par

iv :- <https://youtu.be/l3Sgdk88gH4>

Baghban

Subject - Social Science

Q.1 On a political map of world and locate following countries.

Pakistan, Bangladesh , Bhutan, Sri Lanka, Japan, South Africa, Brazil, ,China,

Q.2 Draw diagrams of the following:

1. Domains of the environment (CH-1)

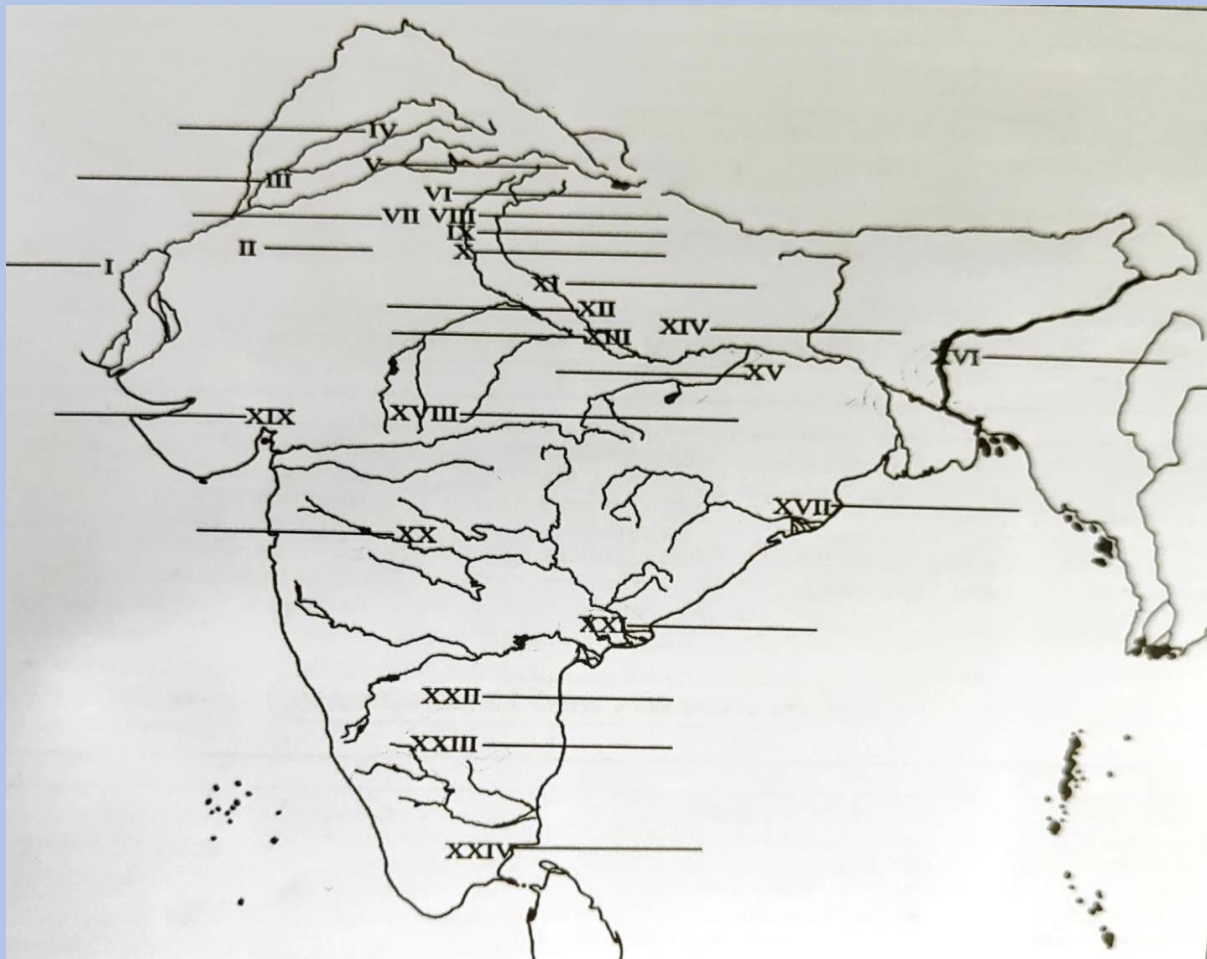
Q.3 (a) Write "The Preamble of the Constitution of India" .

(b) Make a list of fundamental rights and duties.

Q4.List four benefits of Midday meal programme

Q5.List five benefits you get from Land and WaterR.

6.write the names of the names of the province of Delhi .



SUBJECT : SANSKRIT

KENDRIYA VIDYALAYA NO.2 CUTTACK

ग्रीष्मकालीन अवकाश गृह कार्य

कक्षा - सप्तमी

विषय: — संस्कृत

निर्देश:-सभी विद्यार्थी ग्रीष्मकालीन अवकाश कार्य संस्कृत कॉपी में करेंगे।

1. प्रातः श्लोक लिखत।(प्रातः काल का श्लोक लिखिए।)
2. 1 तः 50 पर्यन्तं संख्याः संस्कृतेन लिखित्वा कण्ठस्थं कुर्वन्तु।(1 से 50 तक गिनती संस्कृत में याद करो और लिखो।)
3. विद्यालये उपयोगिनो 10 वस्तुनः चित्रं कृत्वा तेषां नामानि संस्कृतेन लिखन्तु। (विद्यालय में काम आने वाली किन्हीं 10 वस्तुओं का चित्र बनाकर संस्कृत में उनका नाम लिखो।)
4. दश शरीराङ्गानाम् चित्रं कृत्वा तेषां नामानि संस्कृतेन लिखन्तु। (10 शरीर के अंगों का चित्र बनाकर संस्कृत में उनका नाम लिखो।)
5. "किम्", "तत्" च शब्दरूपाणि लिखित्वा कण्ठस्थं कुर्वन्तु। (तत् और किम् शब्द रूप पुल्लिङ्ग स्त्रीलिङ्ग नपुंसकलिङ्ग तीनों लिंगों में लिखो और याद करो।)
6. चर् धातुः पञ्चलकारानां रूप लिखित्वा कण्ठस्थं कुर्वन्तु।। (लट्, लृट्, लोट्, लङ्, च विधिलिङ्ग) (चर् धातु लट्, लोट्, लङ्, लृट्, विधिलिङ्ग पांचों लकार लिखो और याद करो।)
7. परोपकारस्य सम्बन्धिनि कानिचन श्लोकद्वयं संस्कृतेन लिखित्वा हिन्दीभाषायां अनुवादं कुर्वन्तु। (परोपकार से संबंधित कोई दो श्लोक संस्कृत में लिखकर उनका हिंदी अनुवाद लिखो।)

SUBJECT: ART

1. Make any five 3D craft work

Reference :

**<https://www.youtube.com/shorts/P2yhWk51zXI>
[youtube.com/watch?v=pDkUlrJFVaE](https://www.youtube.com/watch?v=pDkUlrJFVaE)**

2. Draw any five portraits ,2D (colour or shading)

Reference :

**[https://www.youtube.com/shorts/Fndj\\$\\$mij3s](https://www.youtube.com/shorts/Fndj$$mij3s)
<https://www.youtube.com/shorts/WNEgdUxIXO4>**

SUBJECT : WORK EDUCATION

SL NO	CLASS	TOPIC/THEME	ASSIGNMENT	TLO/Skill
01	VII	Cover design, Best out of waste, origami	Origami work(03) Pencil cutting crafts(03)	To make various designs Creativity

SUBJECT: COMPUTER

EXERCISES

A. Fill in the blanks:

- i. _____ has the potential to cause serious harm to a computer system.
- ii. A threat can be _____ and _____.
- iii. _____ Uses computer networks and security holes to replicate itself.
- iv. _____ program can erase your hard disk.
- v. Computer viruses were first widely seen in the late _____.
- vi. Crime conducted with internet called _____.
- vii. _____ is one who breaks into or otherwise violates the system integrity of remote machines with malicious intent.
- viii. File backup and System image are two _____ methods.

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B. Find true or false:

- i. Computer viruses are nothing but computer program that do unwanted things.
- ii. A hacker is hacking software which access in sensitive information from your computer.
- iii. Backup and Restore is a component of Microsoft Windows.
- iv. Cyber means the use of internet technologies and computers.
- v. We shall use a computer to harm other people is one of the ethics of computer.

C. Short answer questions:

- i. What is threat in computer?
- ii. Give one difference between Trojan Horse and worms?
- iii. What is Firewall in windows?
- iv. List two ethics of computer?
- v. Give one difference between Hackers and Crackers?
- vi. Why we need Backup?
- vii. What are the types of Backup? Write name of each.
- viii. What do you mean by Restore? How it is helpful for you?



Submit homework on very first day after reopening of Vidyalaya

आप सभी स्वस्थ रहें , मस्त रहें , खुश रहें , सीखते रहें , पेरेंट्स की सहायता करते रहें ।

बहुत बहुत
आशीर्वाद सभी विद्यार्थियों को।

-----Wish you all a very happy vacation, take care-----

UNIT 1

INTEGERS

(A) Main Concepts and Results

- Representation of integers on the number line and their addition and subtraction.
- Properties of integers:
 - Integers are closed under addition, subtraction and multiplication.
 - Addition and multiplication are commutative for integers, i.e., $a + b = b + a$ and $a \times b = b \times a$ for any two integers a and b .
 - Addition and multiplication are associative for integers, i.e., $(a + b) + c = a + (b + c)$ and $(a \times b) \times c = a \times (b \times c)$ for any three integers a , b and c .
 - Zero (0) is an additive identity for integers, i.e., $a + 0 = 0 + a = a$ for any integer a .
 - 1 is multiplicative identity for integers, i.e., $a \times 1 = 1 \times a = a$ for any integer a .
 - Integers show distributive property of multiplication over addition, i.e., $a \times (b + c) = a \times b + a \times c$ for any three integers a , b and c .
- Product of a positive integer and a negative integer is a negative integer, i.e., $a \times (-b) = -ab$, where a and b are positive integers.
- Product of two negative integers is a positive integer, i.e., $(-a) \times (-b) = ab$, where a and b are positive integers.
- Product of even number of negative integers is positive, where as the product of odd number of negative integers is negative, i.e.,

$$\underbrace{(-a) \times (-b) \times \dots \times (-p)}_{\text{even number } 2m \text{ times}} = a \times b \times \dots \times p \text{ and}$$

$$\underbrace{(-a) \times (-b) \times \dots \times (-q)}_{\text{odd number } (2m+1) \text{ times}} = -(a \times b \times \dots \times q), \text{ where } a, b, \dots, p, q \text{ and } m \text{ are positive integers.}$$

- When a positive integer is divided by a negative integer or vice-versa and the quotient obtained is an integer then it is a negative integer, i.e.,

$$a \div (-b) = (-a) \div b = -\frac{a}{b}, \text{ where } a \text{ and } b \text{ are positive integers and } -\frac{a}{b} \text{ is an integer}$$

- When a negative integer is divided by another negative integer to give an integer then it gives a positive integer, i.e., $(-a) \div (-b) = \frac{a}{b}$, where a and b are positive integers and $\frac{a}{b}$ is also an integer.
- For any integer a , $a \div 1 = a$ and $a \div 0$ is not defined.

(B) Solved Examples

In Examples 1 to 3, there are four options, out of which one is correct. Write the correct answer.

Example 1: Madhre is standing in the middle of a bridge which is 20 m above the water level of a river. If a 35 m deep river is flowing under the bridge (see Fig. 1.1), then the vertical distance between the foot of Madhre and bottom level of the river is:

- (a) 55 m (b) 35 m (c) 20 m (d) 15 m

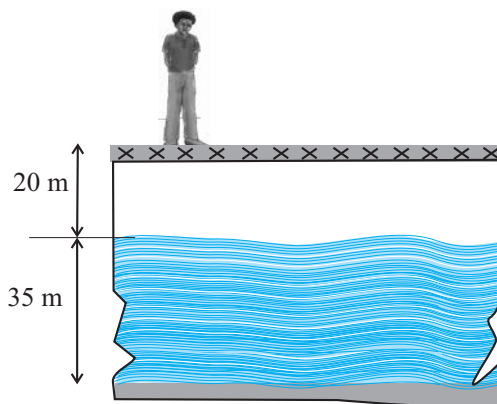


Fig. 1.1

Solution: The correct answer is (a)
[Vertical distance = 20 m + 35 m = 55 m]

Example 2: $[(-10) \times (+9)] + (-10)$ is equal to
(a) 100 (b) -100 (c) -80 (d) 80

Solution: Correct answer is (b)

Example 3: $-16 \div [8 \div (-2)]$ is equal to
(a) -1 (b) 1 (c) 4 (d) -4

Solution: Correct answer is (c),

In Examples 4 and 5, fill in the blanks to make the statements true.

Example 4: $(-25) \times 30 = -30 \times \underline{\hspace{2cm}}$.

Solution: 25

Example 5: $75 \div \underline{\hspace{2cm}} = -75$

Solution: -1

ADDING INTEGERS

If the signs are the same

Find the sum of the values of integers without sign, and then use the same sign as the integers have.

If the signs are different

Find the difference of the values of integers without sign (subtract lower value integer from greater value integer) and then use the sign of the integer with the greater value.

In Examples 6 and 7, state whether the statements are True or False.

Example 6: $(-5) \times (-7)$ is same as $(-7) \times (-5)$

Solution : True

Example 7: $(-80) \div (4)$ is not same as $80 \div (-4)$

Solution: False

Example 8: Find the odd one out* of the four options in the following:

(a) (-2, 24) (b) (-3, 10) (c) (-4, 12) (d) (-6, 8)

Solution: Here $-2 \times 24 = -48$,
 $-4 \times 12 = -48$ and
 $-6 \times 8 = -48$

* To find odd one out, you have to look for a pattern between the numbers and then find out which option is not on that pattern.

All the pairs i.e. $(-2, 24)$; $(-4, 12)$; $(-6, 8)$ give same answer on multiplication, whereas $-3 \times 10 = -30$, gives a different answer. So, odd one is (b).

Example 9: Find the odd one out of the four options given below:

- (a) $(-3, -6)$ (b) $(+1, -10)$ (c) $(-2, -7)$ (d) $(-4, -9)$

Solution: Here $-3 + (-6) = -9$,

$$+1 + (-10) = -9 \text{ and}$$

$$-2 + (-7) = -9$$

All the above pairs i.e. $(-3, -6)$; $(+1, -10)$; $(-2, -7)$ give same answer on adding, whereas $-4 + (-9) = -13$, gives a different answer. So, odd one out is (d).

Example 10: Match the integer in Column I to an integer in Column II so that the sum is between -11 and -4

Column I

- (a) -6
(b) $+1$
(c) $+7$
(d) -2

Column II

- (i) -11
(ii) -5
(iii) $+1$
(iv) -13

Solution:

(a) \leftrightarrow (iii)

because $-6 + (+1) = -5$, which lies between -11 and -4 .

(b) \leftrightarrow (i)

because $+1 + (-11) = -10$ which lies between -11 and -4 .

(c) \leftrightarrow (iv)

because $+7 + (-13) = -6$ which lies between -11 and -4

(d) \leftrightarrow (ii)

because $-2 + (-5) = -7$ which lies between -11 and -4 .

Example 11: If a is an integer other than 1 and -1 , match the following:

Column I

- (a) $a \div (-1)$
(b) $1 \div (a)$
(c) $(-a) \div (-a)$
(d) $a \div (+1)$

Column II

- (i) a
(ii) 1
(iii) Not an integer
(iv) $-a$

Solution: (a) \leftrightarrow (iv) (b) \leftrightarrow (iii) (c) \leftrightarrow (ii) (d) \leftrightarrow (i)

Example 12: Write a pair of integers whose sum is zero (0) but difference is 10.

Solution: Since sum of two integers is zero, one integer is the additive inverse of other integer, like $-3, 3; -4, 4$ etc. But the difference has to be 10. So, the integers are 5 and -5 as $5 - (-5)$ is 10.

SUBTRACTING INTEGERS

Words	Numbers	Formula
To subtract an integer, add its inverse	$3 - 7 = 3 + (-7)$ $5 - (-8) = 5 + 8$	$a - b = a + (-b)$ $a - (-b) = a + b$

Example 13: Write two integers which are smaller than -3 , but their difference is greater than -3 .

Solution: -5 and -4 are smaller than -3 but their difference is $(-4) - (-5) = 1$ which is greater than -3 .

or

-6 and -10 are smaller than -3 but their difference is $(-6) - (-10) = 4$ which is greater than -3 .

Example 14: Write a pair of integers whose product is -15 and whose difference is 8.

Solution: There are few pairs of integers whose product is -15 .

e.g.

$$\begin{aligned} & -1 \times 15 \\ & -3 \times 5 \\ & 3 \times (-5) \\ & 15 \times (-1) \end{aligned}$$

but difference of -3 and 5 or -5 and 3 is 8. So the required pair of integers is $-3, 5$ and $-5, 3$.

Example 15: If Δ is an operation such that for integers a and b we have $a \Delta b = a \times a + b \times b - a \times b$, then find $(-3) \Delta 2$.

Solution : $-3 \Delta 2 = (-3) \times (-3) + 2 \times 2 - (-3) \times 2$
 $= 9 + 4 - (-6) = 13 + 6 = 19$.

Example 16: In an objective type test containing 25 questions. A student is to be awarded $+5$ marks for every correct answer, -5 for every incorrect answer and zero for not writing any answer. Mention the ways of scoring 110 marks by a student.

Solution: Marks scored = $+110$

So, minimum correct responses = $110 \div (+5) = 22$

Case 1

Correct responses = 22

Marks for 1 correct response = + 5

Marks for 22 correct responses = +110 (22 × 5)

Marks scored = +110

Marks obtained for incorrect answer = 0

So, no incorrect response

And, therefore, 3 were unattempted

Case 2

Correct responses = 23

Marks from 23 correct responses = + 115 (23 × 5)

Marks scored = + 110

Marks obtained for incorrect answers = $110 - (+115)$
= -5

Marks for 1 incorrect answer = -5

Number of incorrect responses = $(-5) \div (-5)$
= 1

So, 23 correct, 1 incorrect and 1 unattempted.

Case 3

Correct responses = 24

Marks from 24 correct responses = + 120 (24 × 5)

Marks scored = + 110

Marks obtained for incorrect answers = $+110 - (+120)$
= -10

Number of incorrect responses = $(-10) \div (-5)$
= 2

Thus the number of questions = $24 + 2 = 26$. Whereas, total number of questions is 25. So, this case is not possible.

So, the possible ways are:

- 22 correct, 0 incorrect, 3 unattempted
- 23 correct, 1 incorrect, 1 unattempted.

MULTIPLYING AND DIVIDING TWO INTEGERS

If the signs are the same, the sign of the answer is **positive**.

If the signs are different, the sign of the answer is **negative**.

Application on Problem Solving Strategy



Example 17

A boy standing on the third stair on a staircase goes up by five more stairs. Which stair is he standing at now? At which step will he be after he comes down by 2 stairs?

Solution:



Understand and Explore the Problem

- What do you know?
The current position of the boy.
- What are we trying to find?
The new position of the boy after he takes five more stairs in the same direction.



Plan a Strategy

- Going up one stairs is equal to $+1$ and coming down by one stairs is equal to -1 . Ground level is taken as 0.



Solve

- He is currently at the third stair i.e. at $(+3)$.
 - He goes up 5 stairs in the same direction.
 - Since $3 + 5 = 8$. Therefore, he is at 8th stair on the staircase.
- Now, the boy comes down by 2 stairs. Since he comes down in opposite direction i.e. downwards by 2 stairs (i.e. -2), so $8 + (-2) = 8 - 2 = 6$. He is at 6th step now.



Revise

Since the boy moves 5 stairs up and then 2 stairs down, therefore, as a result he moves $(5 - 2)$ stairs i.e. 3 stairs up. As he was on stair 3 and since he goes up by 3 stairs (i.e. $+3$), so, he is at $(3 + 3)$ the i.e 6th step now.

Think and Discuss

1. Can you find the position of the boy if he comes down further by 3 more stairs?

(C) Exercise

In the Questions 1 to 25, there are four options, out of which only one is correct. Write the correct one.

- When the integers 10, 0, 5, - 5, - 7 are arranged in descending or ascending order, then find out which of the following integers always remains in the middle of the arrangement.

(a) 0 (b) 5 (c) - 7 (d) - 5
- By observing the number line (Fig. 1.2), state which of the following statements is not true.



Fig. 1.2

- B is greater than -10 (b) A is greater than 0
 - B is greater than A (d) B is smaller than 0
- By observing the above number line (Fig. 1.2), state which of the following statements is true.

(a) B is 2 (b) A is - 4

(c) B is -13 (d) B is - 4

Think and Discuss

- Compare** the sums $10 + (-22)$ and $-10 + 22$.
- Describe** how to add the following addition expressions on a number line, $9 + (-13)$ and $-13 + 9$. Then compare the sums.

- Next three consecutive numbers in the pattern 11, 8, 5, 2, --, --, -- are

(a) 0, - 3, - 6 (b) - 1, - 5, - 8

(c) - 2, - 5, - 8 (d) - 1, - 4, - 7

5. The next number in the pattern $-62, -37, -12$ _____ is
 (a) 25 (b) 13 (c) 0 (d) -13

6. Which of the following statements is not true?

- (a) When two positive integers are added, we always get a positive integer.
 (b) When two negative integers are added we always get a negative integer.
 (c) When a positive integer and a negative integer is added we always get a negative integer.
 (d) Additive inverse of an integer 2 is (-2) and additive inverse of (-2) is 2.

7. On the following number line value 'Zero' is shown by the point



- (a) X (b) Y (c) Z (d) W

8. If \otimes , \circ , \ominus and \bullet represent some integers on number line, then descending order of these numbers is



- (a) $\bullet, \otimes, \ominus, \circ$ (b) $\otimes, \bullet, \ominus, \circ$ (c) $\circ, \ominus, \otimes, \bullet$ (d) $\circ, \bullet, \otimes, \ominus$

9. On the number line, the value of $(-3) \times 3$ lies on right hand side of

- (a) -10 (b) -4 (c) 0 (d) 9

10. The value of $5 \div (-1)$ does not lie between

- (a) 0 and -10 (b) 0 and 10 (c) -4 and -15 (d) -6 and 6

11. Water level in a well was 20m below ground level. During rainy season, rain water collected in different water tanks was drained

into the well and the water level rises 5 m above the previous level. The wall of the well is 1 m 20 cm high and a pulley is fixed at a height of 80 cm. Raghu wants to draw water from the well. The minimum length of the rope that he can use is

- (a) 17 m (b) 18 m (c) 96 m (d) 97 m

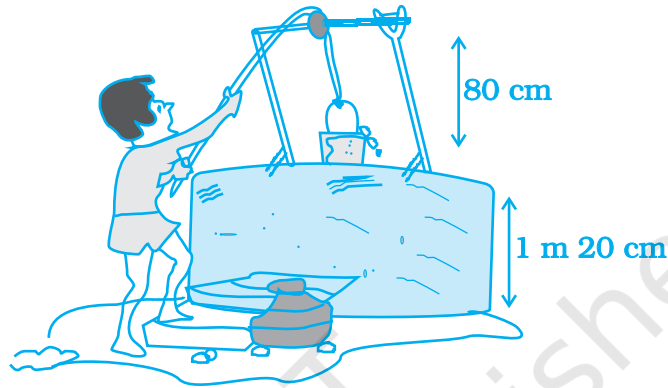


Fig. 1.3

12. $(-11) \times 7$ is not equal to
 (a) $11 \times (-7)$ (b) $-(11 \times 7)$ (c) $(-11) \times (-7)$ (d) $7 \times (-11)$
13. $(-10) \times (-5) + (-7)$ is equal to
 (a) -57 (b) 57 (c) -43 (d) 43
14. Which of the following is not the additive inverse of a ?
 (a) $-(-a)$ (b) $a \times (-1)$ (c) $-a$ (d) $a \div (-1)$

Vocabulary

1. _____ is the _____ of addition.
2. The expression 3×4 and 4×3 are equal by the _____.
3. The expressions $1 + (2 + 3)$ and $(1 + 2) + 3$ are equal by the _____.
4. Multiplication and _____ are opposite operations.
5. _____ and _____ are commutative.

- Addition
- Associative Property
- Commutative Property
- Division
- Multiplication
- Opposite Operation
- Subtraction

15. Which of the following is the multiplicative identity for an integer a ?

- (a) a (b) 1 (c) 0 (d) -1

16. $[(-8) \times (-3)] \times (-4)$ is not equal to

- (a) $(-8) \times [(-3) \times (-4)]$ (b) $[(-8) \times (-4)] \times (-3)$
 (c) $[(-3) \times (-8)] \times (-4)$ (d) $(-8) \times (-3) - (-8) \times (-4)$

17. $(-25) \times [6 + 4]$ is not same as

- (a) $(-25) \times 10$ (b) $(-25) \times 6 + (-25) \times 4$
 (c) $(-25) \times 6 \times 4$ (d) -250

18. -35×107 is not same as

- (a) $-35 \times (100 + 7)$ (b) $(-35) \times 7 + (-35) \times 100$
 (c) $-35 \times 7 + 100$ (d) $(-30 - 5) \times 107$

19. $(-43) \times (-99) + 43$ is equal to

- (a) 4300 (b) -4300 (c) 4257 (d) -4214

20. $(-16) \div 4$ is not same as

- (a) $(-4) \div 16$ (b) $-(16 \div 4)$ (c) $16 \div (-4)$ (d) -4

21. Which of the following does not represent an integer?

- (a) $0 \div (-7)$ (b) $20 \div (-4)$ (c) $(-9) \div 3$ (d) $(-12) \div 5$

22. Which of the following is different from the others?

- (a) $20 + (-25)$ (b) $(-37) - (-32)$
 (c) $(-5) \times (-1)$ (d) $(45) \div (-9)$

23. Which of the following shows the maximum rise in temperature?

- (a) 23° to 32° (b) -10° to $+1^\circ$ (c) -18° to -11° (d) -5° to 5°

24. If a and b are two integers, then which of the following may not be an integer?

- (a) $a + b$ (b) $a - b$ (c) $a \times b$ (d) $a \div b$

25. For a non-zero integer a which of the following is not defined?

- (a) $a \div 0$ (b) $0 \div a$ (c) $a \div 1$ (d) $1 \div a$

Encircle the odd one of the following (Questions 26 to 30).

26. (a) $(-3, 3)$ (b) $(-5, 5)$ (c) $(-6, 1)$ (d) $(-8, 8)$

27. (a) $(-1, -2)$ (b) $(-5, +2)$ (c) $(-4, +1)$ (d) $(-9, +7)$

28. (a) $(-9) \times 5 \times 6 \times (-3)$ (b) $9 \times (-5) \times 6 \times (-3)$
 (c) $(-9) \times (-5) \times (-6) \times 3$ (d) $9 \times (-5) \times (-6) \times 3$
29. (a) $(-100) \div 5$ (b) $(-81) \div 9$
 (c) $(-75) \div 5$ (d) $(-32) \div 9$
30. (a) $(-1) \times (-1)$ (b) $(-1) \times (-1) \times (-1)$
 (c) $(-1) \times (-1) \times (-1) \times (-1)$ (d) $(-1) \times (-1) \times (-1) \times (-1) \times (-1) \times (-1)$

In Questions 31 to 71, fill in the blanks to make the statements true.

31. $(-a) + b = b +$ Additive inverse of _____.
32. _____ $\div (-10) = 0$
33. $(-157) \times (-19) + 157 =$ _____
34. $[(-8) + \text{_____}] + \text{_____} = \text{_____} + [(-3) + \text{_____}] = -3$
35. On the following number line, $(-4) \times 3$ is represented by the point _____.



36. If x , y and z are integers then $(x + \text{_____}) + z = \text{_____} + (y + \text{_____})$
37. $(-43) + \text{_____} = -43$
38. $(-8) + (-8) + (-8) = \text{_____} \times (-8)$
39. $11 \times (-5) = -(\text{_____} \times \text{_____}) = \text{_____}$
40. $(-9) \times 20 = \text{_____}$
41. $(-23) \times (42) = (-42) \times \text{_____}$
42. While multiplying a positive integer and a negative integer, we multiply them as _____ numbers and put a _____ sign before the product.
43. If we multiply _____ number of negative integers, then the resulting integer is positive.
44. If we multiply six negative integers and six positive integers, then the resulting integer is _____.

45. If we multiply five positive integers and one negative integer, then the resulting integer is _____.
46. _____ is the multiplicative identity for integers.
47. We get additive inverse of an integer a when we multiply it by _____.
48. $(-25) \times (-2) =$ _____
49. $(-5) \times (-6) \times (-7) =$ _____
50. $3 \times (-1) \times (-15) =$ _____
51. $[12 \times (-7)] \times 5 =$ _____ $\times [(-7) \times$ _____ $]$
52. $23 \times (-99) =$ _____ $\times (-100 +$ _____ $) = 23 \times$ _____ $+ 23 \times$ _____
53. _____ $\times (-1) = -35$
54. _____ $\times (-1) = 47$

Think and Discuss

- Explain** why $10 - (-10)$ does not equal $-10 - 10$.
- Describe** the answer that you get when you subtract a greater number from a lesser number.

55. $88 \times$ _____ $= -88$
56. _____ $\times (-93) = 93$
57. $(-40) \times$ _____ $= 80$
58. _____ $\times (-23) = -920$
59. When we divide a negative integer by a positive integer, we divide them as whole numbers and put a _____ sign before quotient.
60. When -16 is divided by _____ the quotient is 4.

61. Division is the inverse operation of _____
62. $65 \div (-13) = \underline{\hspace{2cm}}$
63. $(-100) \div (-10) = \underline{\hspace{2cm}}$
64. $(-225) \div 5 = \underline{\hspace{2cm}}$
65. $\underline{\hspace{2cm}} \div (-1) = -83$
66. $\underline{\hspace{2cm}} \div (-1) = 75$
67. $51 \div \underline{\hspace{2cm}} = -51$
68. $113 \div \underline{\hspace{2cm}} = -1$
69. $(-95) \div \underline{\hspace{2cm}} = 95$
70. $(-69) \div (69) = \underline{\hspace{2cm}}$
71. $(-28) \div (-28) = \underline{\hspace{2cm}}$

In Questions 72 to 108, state whether the statements are True or False.

72. $5 - (-8)$ is same as $5 + 8$.
73. $(-9) + (-11)$ is greater than $(-9) - (-11)$.
74. Sum of two negative integers always gives a number smaller than both the integers.
75. Difference of two negative integers cannot be a positive integer.
76. We can write a pair of integers whose sum is not an integer.
77. Integers are closed under subtraction.
78. $(-23) + 47$ is same as $47 + (-23)$.
79. When we change the order of integers, their sum remains the same.
80. When we change the order of integers their difference remains the same.
81. Going 500 m towards east first and then 200 m back is same as going 200 m towards west first and then going 500 m back.
82. $(-5) \times (33) = 5 \times (-33)$
83. $(-19) \times (-11) = 19 \times 11$

84. $(-20) \times (5 - 3) = (-20) \times (-2)$
85. $4 \times (-5) = (-10) \times (-2)$
86. $(-1) \times (-2) \times (-3) = 1 \times 2 \times 3$
87. $-3 \times 3 = -12 - (-3)$
88. Product of two negative integers is a negative integer.
89. Product of three negative integers is a negative integer.
90. Product of a negative integer and a positive integer is a positive integer.
91. When we multiply two integers their product is always greater than both the integers.
92. Integers are closed under multiplication.
93. $(-237) \times 0$ is same as $0 \times (-39)$
94. Multiplication is not commutative for integers.
95. (-1) is not a multiplicative identity of integers.
96. 99×101 can be written as $(100 - 1) \times (100 + 1)$
97. If a, b, c are integers and $b \neq 0$ then, $a \times (b - c) = a \times b - a \times c$
98. $(a + b) \times c = a \times c + a \times b$
99. $a \times b = b \times a$
100. $a \div b = b \div a$
101. $a - b = b - a$

Think and Discuss

- List** all possible multiplication and division statements for the integers with 5, -5, 6, -6 and 30, -30.
For example, $5 \times 6 = 30$.
- Compare** the sign of the product of two negative integers with the sign of the sum of two negative integers.
- Suppose** the product of two integers is positive. What do you know about the signs of the integers?

- 102.** $a \div (-b) = -(a \div b)$
- 103.** $a \div (-1) = -a$
- 104.** Multiplication fact $(-8) \times (-10) = 80$ is same as division fact $80 \div (-8) = (-10)$
- 105.** Integers are closed under division.
- 106.** $[(-32) \div 8] \div 2 = -32 \div [8 \div 2]$
- 107.** The sum of an integer and its additive inverse is zero (0).
- 108.** The successor of $0 \times (-25)$ is $1 \times (-25)$
- 109.** Observe the following patterns and fill in the blanks to make the statements true:
- (a) $-5 \times 4 = -20$
 $-5 \times 3 = -15 = -20 - (-5)$
 $-5 \times 2 = \underline{\hspace{2cm}} = -15 - (-5)$
 $-5 \times 1 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$
 $-5 \times 0 = 0 = \underline{\hspace{2cm}}$
 $-5 \times -1 = 5 = \underline{\hspace{2cm}}$
 $-5 \times -2 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$
- (b) $7 \times 4 = 28$
 $7 \times 3 = \underline{\hspace{2cm}} = 28 - 7$
 $7 \times 2 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}} - 7$
 $7 \times 1 = 7 = \underline{\hspace{2cm}} - 7$
 $7 \times 0 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$
 $7 \times -1 = -7 = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$
 $7 \times -2 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$
 $7 \times -3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$
- 110. Science Application:** An atom consists of charged particles called electrons and protons. Each proton has a charge of +1 and each electron has a charge of -1. Remember number of electrons is equal to number of protons, while answering these questions:
- (a) What is the charge on an atom?
 (b) What will be the charge on an atom if it loses an electron?
 (c) What will be the charge on an atom if it gains an electron?
- 111.** An atom changes to a charged particle called ion if it loses or gains electrons. The charge on an ion is the charge on electrons plus charge

on protons. Now, write the missing information in the table given below:

Name of Ion	Proton Charge	Electron Charge	Ion Charge
Hydroxide ion	+9	—	-1
Sodium ion	+11	—	+1
Aluminium ion	+13	-10	—
Oxide ion	+8	-10	—



Plan a Strategy

- Some problems contain a lot of information. Read the entire problem carefully to be sure you understand all of the facts. You may need to read it over several times perhaps aloud so that you can hear yourself.
- Then decide which information is the most important (prioritise). Is there any information that is absolutely necessary to solve the problem? This information is the most important.
- Finally, put the information in order (sequence). Use comparison words like *before*, *after*, *longer*, *shorter*, and so on to help you. Write down the sequence before you try to solve the problem.

Read the problem given below and then answer the questions that follow:

- Five friends are standing in a line waiting for the opening of a show. They are in line according to their arrival. Shreya arrived 3 minutes after Sachin. Roy took his place in line at 9:01 P.M. He was 1 minute behind Reena and 7 minutes ahead of Shreya. The first person arrived at 9:00 P.M. Babu showed up 6 minutes after the first person. List the time of each person's arrival.
 - Whose arrival information helped you to determine arrival time of each?
 - Can you determine the order without the time?
 - List the friends' order from the earliest arrival to the last arrival.

- 112. Social Studies Application:** Remembering that 1AD came immediately after 1BC, while solving these problems take 1BC as -1 and 1AD as $+1$.
- The Greco-Roman era, when Greece and Rome ruled Egypt started in the year 330 BC and ended in the year 395 AD. How long did this era last?
 - Bhaskaracharya was born in the year 1114 AD and died in the year 1185 AD. What was his age when he died?
 - Turks ruled Egypt in the year 1517 AD and Queen Nefertis ruled Egypt about 2900 years before the Turks ruled. In what year did she rule?
 - Greek mathematician Archimedes lived between 287 BC and 212 BC and Aristotle lived between 380 BC and 322 BC. Who lived during an earlier period?
- 113.** The table shows the lowest recorded temperatures for each continent. Write the continents in order from the lowest recorded temperature to the highest recorded temperature.

The Lowest Recorded Temperatures	
Continent	Temperature (in Fahrenheit)
Africa	-11°
Antarctica	-129°
Asia	-90°
Australia	-9°
Europe	-67°
North America	-81°
South America	-27°

- 114.** Write a pair of integers whose product is -12 and there lies seven integers between them (excluding the given integers).
- 115.** From given integers in Column I match an integer of Column II so that their product lies between -19 and -6 :

Column I

-5
 6
 -7
 8

Column II

1
 -1
 3
 -2

116. Write a pair of integers whose product is -36 and whose difference is 15 .

117. Match the following

Column I

- (a) $a \times 1$
- (b) 1
- (c) $(-a) \div (-b)$
- (d) $a \times (-1)$
- (e) $a \times 0$
- (f) $(-a) \div b$
- (g) 0
- (h) $a \div (-a)$
- (i) $-a$

Column II

- (i) Additive inverse of a
- (ii) Additive identity
- (iii) Multiplicative identity
- (iv) $a \div (-b)$
- (v) $a \div b$
- (vi) a
- (vii) $-a$
- (viii) 0
- (ix) -1

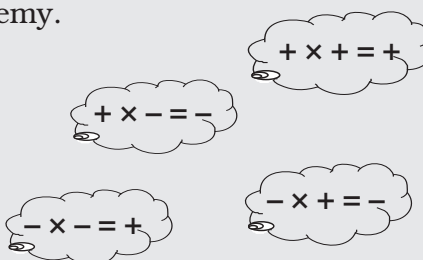
118. You have ₹ 500 in your savings account at the beginning of the month. The record below shows all of your transactions during the month. How much money is in your account after these transactions?

Cheque No.	Date	Transaction Description	Payment	Deposit
384102	4/9	Jal Board	₹ 120	₹ 200
275146	12/9	Deposit		
384103	22/9	LIC India	₹ 240	₹ 150
801351	29/9	Deposit		

Think and Discuss

Is it not true? If $+$ is a friend and $-$ is an enemy.

- Your friend's friend is your friend.
- Your friend's enemy is your enemy.
- Your enemy's friend is your enemy.
- Your enemy's enemy is your friend.



- 119.** (a) Write a positive integer and a negative integer whose sum is a negative integer.
- (b) Write a positive integer and a negative integer whose sum is a positive integer.
- (c) Write a positive integer and a negative integer whose difference is a negative integer.
- (d) Write a positive integer and a negative integer whose difference is a positive integer.
- (e) Write two integers which are smaller than -5 but their difference is -5 .
- (f) Write two integers which are greater than -10 but their sum is smaller than -10 .
- (g) Write two integers which are greater than -4 but their difference is smaller than -4 .
- (h) Write two integers which are smaller than -6 but their difference is greater than -6 .
- (i) Write two negative integers whose difference is 7 .
- (j) Write two integers such that one is smaller than -11 , and other is greater than -11 but their difference is -11 .
- (k) Write two integers whose product is smaller than both the integers.
- (l) Write two integers whose product is greater than both the integers.

120. What's the Error? Ramu evaluated the expression $-7 - (-3)$ and came up with the answer -10 . What did Ramu do wrong?

121. What's the Error? Reeta evaluated $-4 + d$ for $d = -6$ and gave an answer of 2 . What might Reeta have done wrong?

122. The table given below shows the elevations relative to sea level of four locations.

Taking sea level as zero, answer the following questions:

Location	Elevation (in m)
A	-180
B	1600
C	-55
D	3200

- (a) Which location is closest to sea level?
 (b) Which location is farthest from sea level?
 (c) Arrange the locations from the least to the greatest elevation.

123. You are at an elevation 380 m above sea level as you start a motor ride. During the ride, your elevation changes by the following metres: 540 m, -268 m, 116 m, -152 m, 490 m, -844 m, 94 m. What is your elevation relative to the sea level at the end of the ride?

124. Evaluate the following, using distributive property.

- (i) -39×99 (ii) $(-85) \times 43 + 43 \times (-15)$
 (iii) $53 \times (-9) - (-109) \times 53$ (iv) $68 \times (-17) + (-68) \times 3$

125. If $*$ is an operation such that for integers a and b we have

$$a * b = a \times b + (a \times a + b \times b)$$

then find (i) $(-3) * (-5)$

(ii) $(-6) * 2$

126. If Δ is an operation such that for integers a and b we have

$$a \Delta b = a \times b - 2 \times a \times b + b \times b \quad (-a) \times b + b \times b$$

then find (i) $4 \Delta (-3)$

(ii) $(-7) \Delta (-1)$

Also show that $4 \Delta (-3) \neq (-3) \Delta 4$

and $(-7) \Delta (-1) \neq (-1) \Delta (-7)$

127. Below u , v , w and x represent different integers, where $u = -4$ and $x \neq 1$. By using following equations, find each of the values:

$$u \times v = u$$

$$x \times w = w$$

$$u + x = w$$

- (a) v
 (b) w
 (c) x

Explain your reasoning using the properties of integers.

128. Height of a place A is 1800 m above sea level. Another place B is 700 m below sea level. What is the difference between the levels of these two places?

129. The given table shows the freezing points in $^{\circ}\text{F}$ of different gases at sea level. Convert each of these into $^{\circ}\text{C}$ to the nearest integral value using the relation and complete the table,

$$C = \frac{5}{9} (F - 32)$$

Gas	Freezing Point at Sea Level (°F)	Freezing Point at Sea Level (°C)
Hydrogen	-435	
Krypton	-251	
Oxygen	-369	
Helium	-458	
Argon	-309	

- 130.** Sana and Fatima participated in an apple race. The race was conducted in 6 parts. In the first part, Sana won by 10 seconds. In the second part she lost by 1 minute, then won by 20 seconds in the third part and lost by 25 seconds in the fourth part, she lost by 37 seconds in the fifth part and won by 12 seconds in the last part. Who won the race finally?
- 131.** A green grocer had a profit of ₹ 47 on Monday, a loss of ₹ 12 on Tuesday and loss of ₹ 8 on Wednesday. Find his net profit or loss in 3 days.
- 132.** In a test, +3 marks are given for every correct answer and -1 mark are given for every incorrect answer. Sona attempted all the questions and scored +20 marks though she got 10 correct answers.
- How many incorrect answers has she attempted?
 - How many questions were given in the test?
- 133.** In a true-false test containing 50 questions, a student is to be awarded 2 marks for every correct answer and -2 for every incorrect answer and 0 for not supplying any answer. If Yash secured 94 marks in a test, what are the possibilities of his marking correct or wrong answer?
- 134.** A multistorey building has 25 floors above the ground level each of height 5m. It also has 3 floors in the basement each of height 5m. A lift in building moves at a rate of 1m/s. If a man starts from 50m above the ground, how long will it take him to reach at 2nd floor of basement?
- 135.** Taking today as zero on the number line, if the day before yesterday is 17 January, what is the date 3 days after tomorrow?

Think and Discuss

- Explain** how integers are used in real life to manage a bank account.
- Explain** whether -1, -4, and 5 are additive inverses.

136. The highest point measured above sea level is the summit of Mt. Everest which is 8,848m above sea level and the lowest point is challenger Deep at the bottom of Mariana Trench which is 10911m below sea level. What is the vertical distance between these two points?

(D) Application

Puzzle 1

Fill in the blank space of the following magic square so that the sum of the numbers in each row, each column and each of the diagonals is -6 .

(i)

-1		
3	-2	
	5	

(ii) In this magic square, sum of the numbers in every row, column and each of the diagonals is -2 . Fill in the blank:

7		-6	
		1	
0	-2		
-5		6	-8

Puzzle 2

If $a * b$ means $a \times b + 2$ and

$a \# b$ means $-a + b - (-3)$,

then find the value of the following:

- | | |
|----------------------|----------------------|
| (i) $-4 * 3$ | (ii) $(-3) * (-2)$ |
| (iii) $(-7) \# (-3)$ | (iv) $2 \# (-4)$ |
| (v) $7 * (-5)$ | (vi) $(-7 * 2) \# 3$ |

Next, match these answers with suitable letters by looking at the table below and arrange them in increasing order of integers to decode the name of the mathematician:

Integers	-9	14	-3	4	-10	8	-33	-21	7	18
Letters	P	Y	C	T	U	I	E	G	L	D

Puzzle 3

‘Equinoxes’ are the two days of the year when the sun is directly above the earth’s equator, due to which the days and nights are of nearly equal length everywhere on the earth.

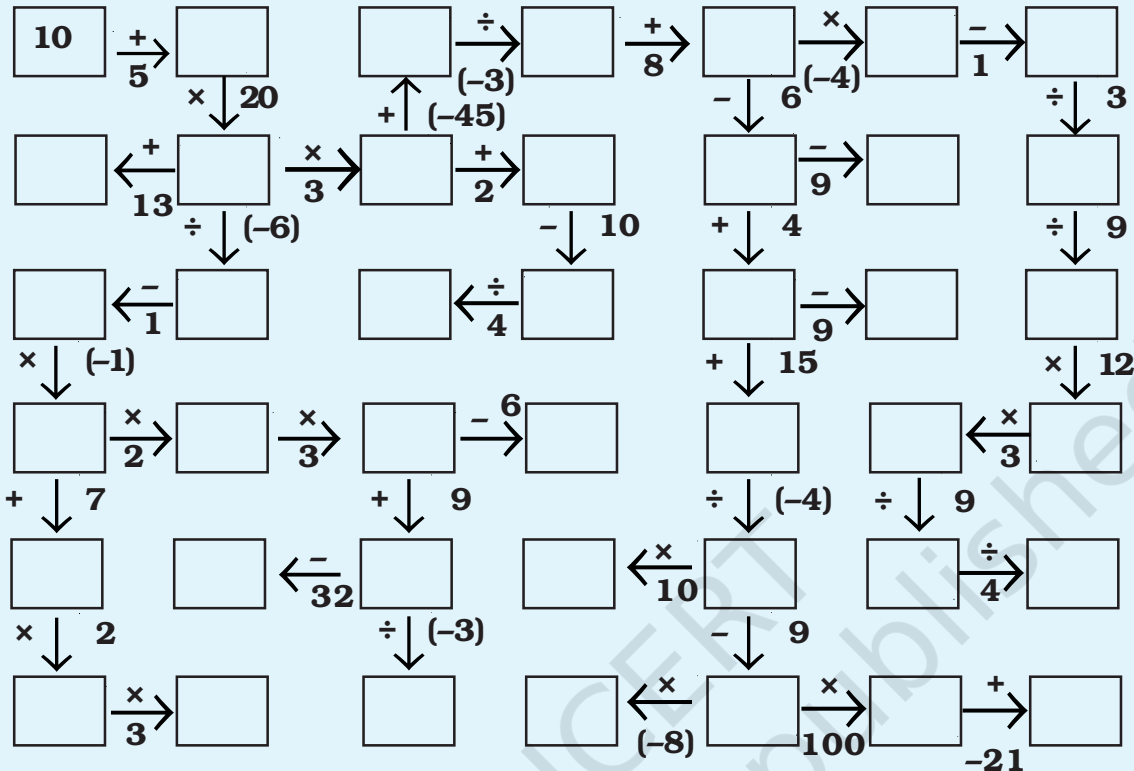
Find the name of the month of autumn equinox using suitable properties of integers by solving the following questions. Match your answer with the letter given in the table and fill it in the box provided in each question.

- (a) $(-1) \times (-2) \times (-3) \times (-4) \times (-5)$
- (b) $18946 \times 99 - (-18946)$
- (c) $-1 + (-2) + (-3) + (-9) + (-8)$
- (d) $15 \times (-99)$
- (e) $-143 + 600 - 257 + 400$
- (f) $0 \div (-12)$
- (g) $-125 \times 9 - 125$
- (h) $\underbrace{(-1) \times (-1) \times \dots \times (-1)}_{20 \text{ times}}$
- (i) $\underbrace{-4 + 4 - 4 + 4 - \dots - 4}_{21 \text{ times}}$

1	E
-1485	T
-120	S
-30	P
-4	R
-1250	B
1894600	E
600	E
0	M

Puzzle 4

Complete the number grids by following the direction of arrows.



Puzzle 5

Solve the following riddles.

- (a) Minus of minus six
Minus minus-minus-seven
 What do you get if this is **added** to **minus**-minus-seven again?
- (b) Now **add** the value in riddle (a) to minus four and then minus two you **take away**
Divide this by minus two
 What is this value can you say?
- (c) Take the result of riddle (b) and **subtract** from it minus six
Multiply this by minus two
 What will the answer be?

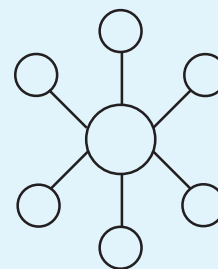


Fig. 1.4

Puzzle 6

Use the integers -2, 4, -5, -12, 20, -25 and 50 just one each in the wheel shown in Fig. 1.4 to make the product 1200 along each line.

FRACTIONS AND DECIMALS

(A) Main Concepts and Results

- A fraction is either a proper fraction or an improper fraction.
- A proper fraction is a number representing a part of a whole. This whole may be a single object or a group of objects. An improper fraction is a number in which numerator is greater than denominator.
- A mixed fraction is a combination of a natural number and a proper fraction.
- Two fractions are multiplied by multiplying their numerators and denominators separately and writing the product as

$$\frac{\text{product of numerators}}{\text{product of denominators}}. \text{ For example, } \frac{2}{5} \times \frac{3}{4} = \frac{2 \times 3}{5 \times 4} = \frac{6}{20}.$$

- A fraction acts as an operator 'of'. For example, $\frac{1}{3}$ of 3 is $\frac{1}{3} \times 3 = 1$.
- The product of two proper fractions is less than each of the fractions, For example, $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$ and $\frac{1}{6}$ is less than both $\frac{1}{2}$ and $\frac{1}{3}$.
- The product of a proper and an improper fraction is less than the improper fraction and greater than the proper fraction. For example, $\frac{1}{2} \times \frac{3}{2} = \frac{3}{4}$ and $\frac{3}{4}$ is less than $\frac{3}{2}$ but greater than $\frac{1}{2}$.
- The product of two improper fractions is greater than the two fractions. For example, $\frac{3}{2} \times \frac{7}{4} = \frac{21}{8}$ and $\frac{21}{8}$ is greater than both $\frac{3}{2}$ and $\frac{7}{4}$.

- The reciprocal of a non-zero fraction is obtained by interchanging its numerator and denominator. For example, reciprocal of $\frac{3}{2}$ is $\frac{2}{3}$.
- While dividing a whole number by a fraction, we multiply the whole number with the reciprocal of that fraction. For example, $3 \div \frac{1}{2} = 3 \times \frac{2}{1}$.
- While dividing a fraction by a natural number, we multiply the fraction by the reciprocal of the natural number. For example, $\frac{1}{4} \div 2 = \frac{1}{4} \times \frac{1}{2}$.
- While dividing one fraction by another fraction, we multiply the first fraction by the reciprocal of the other. For example, $\frac{1}{2} \div \frac{1}{3} = \frac{1}{2} \times \frac{3}{1}$.
- While multiplying two decimal numbers, first multiply them as whole numbers. Count the number of digits to the right of the decimal point in both the decimal numbers. Add the number of digits counted. Put the decimal point in the product by counting the number of digits equal to sum obtained from its rightmost place. For example, $1.2 \times 1.24 = 1.488$.
- To multiply a decimal number by 10, 100 or 1000, we move the decimal point in the number to the right by as many places as many zeros (0) are the right of one. For example, $1.33 \times 10 = 13.3$.
- To divide a decimal number by a natural number, we first take the decimal number as natural number and divide by the given natural number. Then place the decimal point in the quotient as in the decimal number. For example, $\frac{1.2}{4} = 0.3$
- To divide a decimal number by 10, 100 or 1000, shift the decimal point in the decimal number to the left by as many places as there are zeros over 1, to get the quotient. For example, $\frac{1.34}{100} = 0.0134$
- While dividing one decimal number by another, first shift the decimal points to the right by equal number of places in both, to convert the divisor to a natural number and then divide. For example

$$\frac{1.44}{1.2} = \frac{14.4}{12} = 1.2.$$

(B) Solved Examples

In Examples 1 to 11, there are four options, out of which one is correct. Write the correct one.

Example 1: Savita is dividing $1\frac{3}{4}$ kg of sweets equally among her seven friends. How much does each friend receive?

- (a) $\frac{3}{4}$ kg (b) $\frac{1}{4}$ kg (c) $\frac{1}{2}$ kg (d) $\frac{3}{28}$ kg

Solution: Correct answer is (b)

Example 2: If $\frac{3}{4}$ of a number is 12, the number is

- (a) 9 (b) 16 (c) 18 (d) 32

Solution: Correct answer is (b)

Example 3: Product of fractions $\frac{2}{7}$ and $\frac{5}{9}$ is

- (a) $\frac{2 \times 5}{7 + 9}$ (b) $\frac{2 + 5}{2 + 9}$ (c) $\frac{2 \times 9}{5 \times 7}$ (d) $\frac{2 \times 5}{7 \times 9}$

Solution: Correct answer is (d)

Example 4: Given that $0 < p < q < r < s$ and p, q, r, s are integers, which of the following is the smallest?

- (a) $\frac{p+q}{r+s}$ (b) $\frac{p+s}{q+r}$ (c) $\frac{q+s}{p+r}$ (d) $\frac{r+s}{p+q}$

Solution: Correct answer is (a)

Example 5: The next number of the pattern

60, 30, 15, _____ is

- (a) 10 (b) 5 (c) $\frac{15}{4}$ (d) $\frac{15}{2}$

Solution: Correct answer is (d)

Example 6: The decimal expression for 8 rupees 8 paise (in Rupees) is

- (a) 8.8 (b) 8.08 (c) 8.008 (d) 88.0

Solution: Correct answer is (b)

Example 7: Each side of a regular hexagon is 3.5cm long. The perimeter of the given polygon is

- (a) 17.5cm (b) 21cm (c) 18.3cm (d) 20cm

Solution: Correct answer is (b)

Example 8: $2.5 \div 1000$ is equal to

- (a) 0.025 (b) 0.0025 (c) 0.2500 (d) 25000

Solution : Correct answer is (b)

Example 9: Which of the following has the smallest value?

- (a) 0.0002 (b) $\frac{2}{1000}$ (c) $\frac{(0.2)^2}{2}$ (d) $\frac{2}{100} \div 0.01$

Solution: Correct answer is (a)

Example 10: Which of the following has the largest value?

- (a) $\frac{32}{0.05}$ (b) $\frac{0.320}{50}$ (c) $\frac{3.2}{0.05}$ (d) $\frac{3.2}{50}$

Solution: Correct answer is (a)

Example 11: The largest of the following is

- (a) 0.0001 (b) $\frac{1}{1000}$ (c) $(0.100)^2$ (d) $\frac{1}{10} \div 0.1$

Solution: Correct answer is (d)

In Examples 12 to 19, fill in the blanks to make the statement true.

Example 12: A fraction acts as an operator_____

Solution: of

Example 13: Fraction which is reciprocal of $\frac{2}{3}$ is _____.

Solution: $\frac{3}{2}$

Example 14: Product of a proper and improper fraction is _____ the improper fraction.

Solution: less than.

Example 15: The two non-zero fractions whose product is 1, are called the _____ of each other.

Solution: Reciprocal

Example 16: 5 rupees 5 paise = ₹ _____.

Solution: 5.05

Example 17: 45mm = _____ m.

Solution: 0.045

Example 18: $2.4 \times 1000 =$ _____.

Solution: 2400

Example 19: To divide a decimal number by 100, we shift the decimal point in the number to the _____ by _____ places.

Solution: left, two

In Examples 20 to 23 state whether the statements are True or False.

Example 20: Reciprocal of an improper fraction is an improper fraction.

Solution: False

Example 21: $2\frac{2}{5} \div 2\frac{1}{5} = 2$

Solution: False $\left[\text{because } 2\frac{2}{5} \div 2\frac{1}{5} = \frac{12}{5} \times \frac{5}{11} = \frac{12}{11} \right]$

Example 22: $0.04 \div 0.2 = 0.2$

Solution: True

Example 23: $0.2 \times 0.3 = 0.6$

Solution: False [as $0.2 \times 0.3 = 0.06$]

Example 24: Find $\frac{2}{3}$ of 6 using circles with shaded parts.

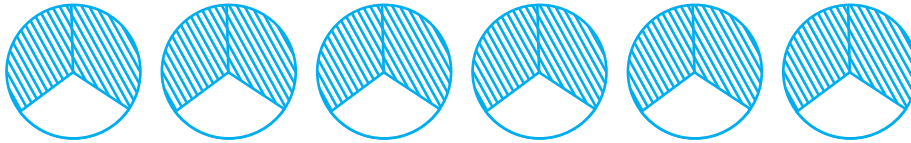


Fig. 2.1

Solution: From the following figure, try to find out $\frac{2}{3}$ of 6.

There are 12 shaded parts out of 18 parts which can be taken as shown

below (Fig. 2.2), which means 4 wholes. Thus $\frac{2}{3}$ of 6 is 4.

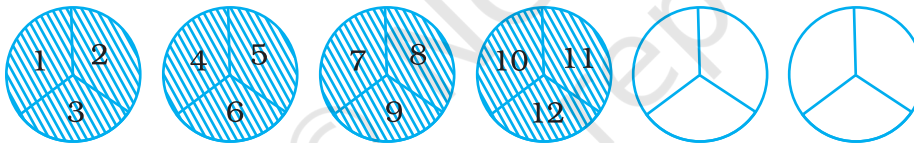


Fig. 2.2

Example 25: Find the value of

$$\frac{1}{4\frac{2}{7}} + \frac{1}{3\frac{11}{13}} + \frac{1}{\left(\frac{5}{9}\right)}$$

Solution: Given expression =

$$\begin{aligned} & \frac{1}{\left(\frac{30}{7}\right)} + \frac{1}{\left(\frac{50}{13}\right)} + \frac{1}{\left(\frac{5}{9}\right)} \\ &= \frac{7}{30} + \frac{13}{50} + \frac{9}{5} \end{aligned}$$

$$= \frac{35}{150} + \frac{39}{150} + \frac{270}{150} = \frac{35 + 39 + 270}{150} = \frac{172}{75}$$

Example 26: There is a $3 \times 3 \times 3$ cube which consists of twenty seven $1 \times 1 \times 1$ cubes (see Fig. 2.3). It is 'tunneled' by removing cubes from the coloured squares.

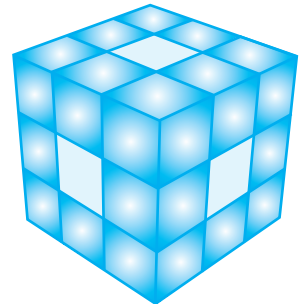


Fig. 2.3

Find:

- (i) Fraction of number of small cubes removed to the number of small cubes left in given cube.
- (ii) Fraction of the number of small cubes removed to the total number of small cubes.
- (iii) What part is (ii) of (i)?

Solution: (i) Number of small cubes removed = $1 + 1 + 1 + 1 + 1 + 1 + 1 = 7$

So, required fraction = $\frac{7}{20}$

(ii) Required fraction = $\frac{7}{27}$

(iii) Required part is $\frac{7}{27} \div \frac{7}{20} = \frac{7}{27} \times \frac{20}{7} = \frac{20}{27}$

Example 27: Ramu finishes $\frac{1}{3}$ part of a work in 1 hour. How much part of the work will be finished in $2\frac{1}{5}$ hours?

Solution: The part of the work finished by Ramu in 1 hour = $\frac{1}{3}$

So, the part of the work finished by Ramu in $2\frac{1}{5}$ hours

$$= 2\frac{1}{5} \times \frac{1}{3} = \frac{11}{5} \times \frac{1}{3} = \frac{11 \times 1}{5 \times 3} = \frac{11}{15}$$

Ramu will finish $\frac{11}{15}$ part of the work in $2\frac{1}{5}$ hours.

Example 28: How many $\frac{2}{3}$ kg pieces can be cut from a cake of weight 4 kg?

Solution: Observe the following figure representing 4 cakes each of 1 kg and try to give the answer.

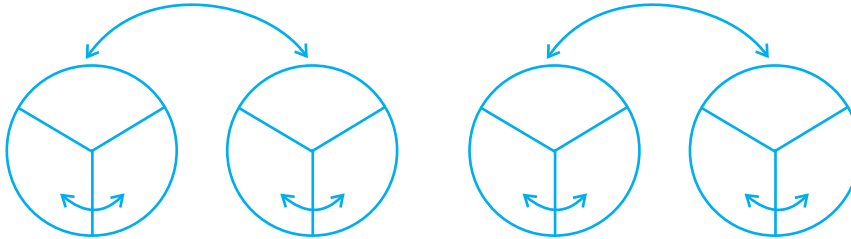


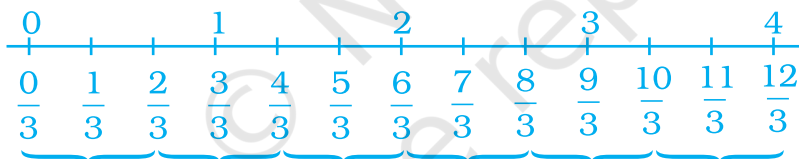
Fig. 2.4

In the above figure we look for ‘how many $\frac{2}{3}$ s are there in these 4 cakes?’

That is, $4 \div \frac{2}{3} = 4 \times \frac{3}{2} = 6$

Alternate Method

This can be observed also in the following way.



We get the answer as 6.

Example 29: Harmeet purchased 3.5kg of potatoes at the rate of ₹13.75 per kg. How much money should she pay in nearest rupees?

Solution: Cost of 1 kg of potatoes = ₹ 13.75.

Cost of 3.5 kg of potatoes = ₹ 13.75 × 3.5

$$\begin{array}{r}
 13.75 \\
 \times 3.5 \\
 \hline
 6875 \\
 4125 \times \\
 \hline
 48.125
 \end{array}$$

So, cost of 3.5 kg of potatoes = ₹ 48, to the nearest rupees.

Example 30: Kavita had a piece of rope of length 9.5 m. She needed some small pieces of rope of length 1.9 m each. How many pieces of the required length will she get out of this rope?

Solution : The length of the rope = 9.5m
 The length of a small piece of rope = 1.9m
 Number of small pieces = $9.5 \text{ m} \div 1.9\text{m}$

$$= \frac{9.5}{1.9} = \frac{9.5 \times 10}{1.9 \times 10}$$

$$= \frac{95}{19} = 5$$

So, she will get 5 small pieces of rope.

Example 31: Three boys earned a total of ₹ 235.50. What was the average amount earned per boy?

Solution : Three boys earned = ₹ 235.50

The average amount earned per boy = ₹ $\frac{235.50}{3}$

$$\begin{array}{r} 78.50 \\ 3 \overline{) 235.50} \\ \underline{21} \\ 25 \\ \underline{24} \\ 15 \\ \underline{15} \\ 0 \end{array}$$

The average amount earned per boy is ₹ 78.50.

Example 32: Find the product of

- (i) $\frac{1}{2}$ and $\frac{5}{8}$ (ii) $\frac{1}{3}$ and $\frac{7}{5}$ (iii) $\frac{4}{3}$ and $\frac{5}{2}$

Solution : (i) $\frac{1}{2} \times \frac{5}{8} = \frac{1 \times 5}{2 \times 8} = \frac{5}{16}$

(ii) $\frac{1}{3} \times \frac{7}{5} = \frac{1 \times 7}{3 \times 5} = \frac{7}{15}$

$$(iii) \quad \frac{4}{3} \times \frac{5}{2} = \frac{4 \times 5}{3 \times 2} = \frac{20}{6} = \frac{10}{3}$$

Example 33: Observe the 3 products given in Example 32 and now give the answers of the following questions.

(i) Does interchanging the fractions in the example,

$$\frac{1}{2} \times \frac{5}{8}, \text{ affect the answer?}$$

(ii) Is the value of the fraction in the product greater or less than the value of either fraction?

Solution : (i) By interchanging $\frac{1}{2} \times \frac{5}{8}$ we get $\frac{5}{8} \times \frac{1}{2}$

$$\frac{5}{8} \times \frac{1}{2} = \frac{5 \times 1}{8 \times 2} = \frac{5}{16} \text{ which is same as the product we get}$$

in Example 32 by multiplying $\frac{1}{2}$ and $\frac{5}{8}$. This means that interchanging the fractions does not affect the answer.

(ii) By observing the 3 products given in the solution of Example 32, we come to know that the value of the fractions in the products are as follows

(a) The product of two fractions whose value is less than 1 i.e. the proper fractions is less than each of the fractions that are multiplied.

(b) The product of a proper and an improper fraction is less than the improper fractions and greater than the proper fraction.

(c) The product of two improper fractions is greater than each of the two fractions.

Example 34 : Reshma uses $\frac{3}{4}$ m of cloth to stitch a shirt. How many

shirts can she make with $2\frac{1}{4}$ m cloth?

Solution : Study the following figures :

Let \square represent $\frac{1}{4}$ m

Then,

$$\frac{\overbrace{\text{||||}}^{1 \text{ m}} \quad \overbrace{\text{||||}}^{1 \text{ m}} \quad \overbrace{\text{||}}^{\frac{1}{4} \text{ m}}}{\text{||||}} = \frac{9 \text{ fourths}}{3 \text{ fourths}} = 3$$

In fact, we calculate that “how many $\frac{3}{4}$ are in $2\frac{1}{4}$?”

And it is calculated as,

$$2\frac{1}{4} \div \frac{3}{4} = \frac{9}{4} \div \frac{3}{4} = \frac{9}{4} \times \frac{4}{3} = \frac{9 \times 4}{4 \times 3} = \frac{9}{3} = 3$$

Thus, 3 shirts can be made with $2\frac{1}{4}$ m of cloth.

MATHEMATICS IN MUSIC

How Does a Music Composer Use Maths?

Music composers write notes that can vary in length. There are whole notes, half notes, quarter notes, eighth notes and sixteen notes.

Example 35 : If the fraction of the frequencies of two notes have a common factor between the numerator and denominator, the two notes are harmonious. Use the graphic below to find the fraction of frequency of notes D and B.



Frequency Chart

Fig. 2.5

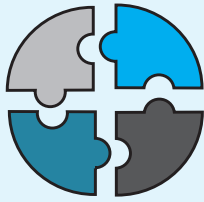
Solution: Fraction of frequencies of notes D and B is

$$= \frac{\text{Frequency of note D}}{\text{Frequency of note B}} = \frac{297}{495} = \frac{3 \times 3 \times 3 \times 11}{3 \times 3 \times 5 \times 11}$$

So, the fraction of the frequencies of notes D and B is $\frac{3}{5}$.

Clearly, the notes D and B are harmonies. Find other pairs of notes which are harmonious.

Application on Problem Solving Strategy



Example 36

Khilona said that we have gone about 120km or $\frac{2}{3}$ of the way to the camp site. So, how much farther do we have to go?

Solution :



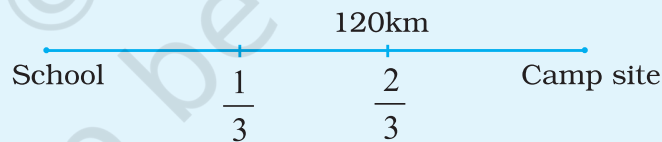
Understand and Explore the Problem

- What do you know?
- We know that 120km is about $\frac{2}{3}$ of the total distance.



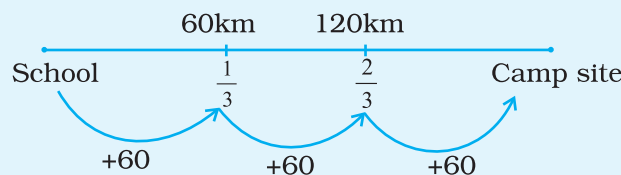
Plan a Strategy

- Draw a diagram showing the distance that Khilona has already gone and the fractional part that it represents.



Solve

- If $\frac{2}{3}$ of the distance is 120km, then $\frac{1}{3}$ of the distance would be $\frac{1}{2}$ of 120km i.e. 60km.



The total distance is $(120 + 60)$ km or 180km.



Revise :

Since $\frac{2}{3}$ of the total distance, denoted by x , equals 120km, so the equation $\frac{2x}{3}=120$ represents this problem. By solving we get $x = 180$ km. Thus the solution is checked.

Think and Discuss

1. If $\frac{1}{3}$ of the total distance is 120 km, then how far is the camp site?
2. Apply both strategies i.e. by drawing and by using equation, to solve other problems and discuss with your friends that which method is easy.

(C) EXERCISE

In questions 1 to 20, out of four options, only one is correct. Write the correct answer.

1. $\frac{2}{5} \times 5\frac{1}{5}$ is equal to:

- (a) $\frac{26}{25}$ (b) $\frac{52}{25}$ (c) $\frac{2}{5}$ (d) 6

2. $3\frac{3}{4} \div \frac{3}{4}$ is equal to:

- (a) 3 (b) 4 (c) 5 (d) $\frac{45}{16}$

3. A ribbon of length $5\frac{1}{4}$ m is cut into small pieces each of length $\frac{3}{4}$ m.

Number of pieces will be:

- (a) 5 (b) 6 (c) 7 (d) 8

4. The ascending arrangement of $\frac{2}{3}, \frac{6}{7}, \frac{13}{21}$ is:

- (a) $\frac{6}{7}, \frac{2}{3}, \frac{13}{21}$ (b) $\frac{13}{21}, \frac{2}{3}, \frac{6}{7}$ (c) $\frac{6}{7}, \frac{13}{21}, \frac{2}{3}$ (d) $\frac{2}{3}, \frac{6}{7}, \frac{13}{21}$

5. Reciprocal of the fraction $\frac{2}{3}$ is:

- (a) 2 (b) 3 (c) $\frac{2}{3}$ (d) $\frac{3}{2}$



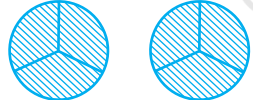

6. The product of $\frac{11}{13}$ and 4 is:

- (a) $3\frac{5}{13}$ (b) $5\frac{3}{13}$ (c) $13\frac{3}{5}$ (d) $13\frac{5}{3}$

7. The product of 3 and $4\frac{2}{5}$ is:

- (a) $17\frac{2}{5}$ (b) $\frac{24}{5}$ (c) $13\frac{1}{5}$ (d) $5\frac{1}{13}$

8. Pictorial representation of $3 \times \frac{2}{3}$ is:

- (a)  (b) 
 (c)  (d) 

9. $\frac{1}{5} \div \frac{4}{5}$ equal to:

- (a) $\frac{4}{5}$ (b) $\frac{1}{5}$ (c) $\frac{5}{4}$ (d) $\frac{1}{4}$

10. The product of 0.03×0.9 is:

- (a) 2.7 (b) 0.27 (c) 0.027 (d) 0.0027

11. $\frac{5}{7} \div 6$ is equal to:

- (a) $\frac{30}{7}$ (b) $\frac{5}{42}$ (c) $\frac{30}{42}$ (d) $\frac{6}{7}$

12. $5\frac{1}{6} \div \frac{9}{2}$ is equal to

- (a) $\frac{31}{6}$ (b) $\frac{1}{27}$ (c) $5\frac{1}{27}$ (d) $\frac{31}{27}$

13. Which of the following represents $\frac{1}{3}$ of $\frac{1}{6}$?

- (a) $\frac{1}{3} + \frac{1}{6}$ (b) $\frac{1}{3} - \frac{1}{6}$ (c) $\frac{1}{3} \times \frac{1}{6}$ (d) $\frac{1}{3} \div \frac{1}{6}$

14. $\frac{3}{7}$ of $\frac{2}{5}$ is equal to

- (a) $\frac{5}{12}$ (b) $\frac{5}{35}$ (c) $\frac{1}{35}$ (d) $\frac{6}{35}$

15. One packet of biscuits requires $2\frac{1}{2}$ cups of flour and $1\frac{2}{3}$ cups of sugar. Estimated total quantity of both ingredients used in 10 such packets of biscuits will be

- (a) less than 30 cups
 (b) between 30 cups and 40 cups
 (c) between 40 cups and 50 cups
 (d) above 50 cups



Vocabulary

1. A number that consists of a whole number and a fraction is called a/an _____?
2. An _____ is a number that represents a part of a whole.
3. A fraction whose numerical (absolute) value is greater than 1 is called a/an _____, and a fraction whose numerical value is between 0 and 1 is called a/an _____.
4. _____ mean the same value.

- **Equivalent Fraction**
- **Fraction**
- **Improper Fraction**
- **Mixed Number**
- **Proper Fraction**

16. The product of 7 and $6\frac{3}{4}$ is

- (a) $42\frac{1}{4}$ (b) $47\frac{1}{4}$ (c) $42\frac{3}{4}$ (d) $47\frac{3}{4}$

17. On dividing 7 by $\frac{2}{5}$, the result is

- (a) $\frac{14}{2}$ (b) $\frac{35}{4}$ (c) $\frac{14}{5}$ (d) $\frac{35}{2}$

18. $2\frac{2}{3} \div 5$ is equal to

- (a) $\frac{8}{15}$ (b) $\frac{40}{3}$ (c) $\frac{40}{5}$ (d) $\frac{8}{3}$

19. $\frac{4}{5}$ of 5 kg apples were used on Monday. The next day $\frac{1}{3}$ of what was left was used. Weight (in kg) of apples left now is

- (a) $\frac{2}{7}$ (b) $\frac{1}{14}$ (c) $\frac{2}{3}$ (d) $\frac{4}{21}$

20. The picture



interprets

- (a) $\frac{1}{4} \div 3$ (b) $3 \times \frac{1}{4}$ (c) $\frac{3}{4} \times 3$ (d) $3 \div \frac{1}{4}$

In Questions 21 to 44, fill in the blanks to make the statements true.

21. Rani ate $\frac{2}{7}$ part of a cake while her brother Ravi ate $\frac{4}{5}$ of the remaining. Part of the cake left is _____

22. The reciprocal of $\frac{3}{7}$ is _____

23. $\frac{2}{3}$ of 27 is _____

24. $\frac{4}{5}$ of 45 is _____
25. $4 \times 6\frac{1}{3}$ is equal to _____
26. $\frac{1}{2}$ of $4\frac{2}{7}$ is _____
27. $\frac{1}{9}$ of $\frac{6}{5}$ is _____

Think and Discuss

- Explain** whether you need to find a common denominator to compare $\frac{2}{3}$ and $-\frac{1}{2}$.
- Describe** the steps you would use to compare 0.235 and 0.239.

28. The lowest form of the product $2\frac{3}{7} \times \frac{7}{9}$ is _____
29. $\frac{4}{5} \div 4$ is equal to _____
30. $\frac{2}{5}$ of 25 is _____
31. $\frac{1}{5} \div \frac{5}{6} = \frac{1}{5} \times \frac{6}{5}$
32. $3.2 \times 10 =$ _____
33. $25.4 \times 1000 =$ _____
34. $93.5 \times 100 =$ _____
35. $4.7 \div 10 =$ _____
36. $4.7 \div 100 =$ _____
37. $4.7 \div 1000 =$ _____
38. The product of two proper fractions is _____ than each of the fractions that are multiplied.
39. While dividing a fraction by another fraction, we _____ the first fraction by the _____ of the other fraction.
40. $8.4 \div$ _____ $= 2.1$

41. $52.7 \div \underline{\hspace{2cm}} = 0.527$
42. $0.5 \underline{\hspace{1cm}} 0.7 = 0.35$
43. $2 \underline{\hspace{1cm}} \frac{5}{3} = \frac{10}{3}$
44. $2.001 \div 0.003 = \underline{\hspace{2cm}}$

In each of the Questions 45 to 54, state whether the statement is True or False.

45. The reciprocal of a proper fraction is a proper fraction.
46. The reciprocal of an improper fraction is an improper fraction.
47. Product of two fractions = $\frac{\text{Product of their denominators}}{\text{Product of their numerators}}$
48. The product of two improper fractions is less than both the fractions.
49. A reciprocal of a fraction is obtained by inverting it upside down.
50. To multiply a decimal number by 1000, we move the decimal point in the number to the right by three places.
51. To divide a decimal number by 100, we move the decimal point in the number to the left by two places.
52. 1 is the only number which is its own reciprocal.
53. $\frac{2}{3}$ of 8 is same as $\frac{2}{3} \div 8$.
54. The reciprocal of $\frac{4}{7}$ is $\frac{4}{7}$.
55. If 5 is added to both the numerator and the denominator of the fraction $\frac{5}{9}$, will the value of the fraction be changed? If so, will the value increase or decrease?
56. What happens to the value of a fraction if the denominator of the fraction is decreased while numerator is kept unchanged?
57. Which letter comes $\frac{2}{5}$ of the way among A and J?

58. If $\frac{2}{3}$ of a number is 10, then what is 1.75 times of that number?
59. In a class of 40 students, $\frac{1}{5}$ of the total number of students like to eat rice only, $\frac{2}{5}$ of the total number of students like to eat chapati only and the remaining students like to eat both. What fraction of the total number of students like to eat both?
60. Renu completed $\frac{2}{3}$ part of her home work in 2 hours. How much part of her home work had she completed in $1\frac{1}{4}$ hours?
61. Reemu read $\frac{1}{5}$ th pages of a book. If she reads further 40 pages, she would have read $\frac{7}{10}$ th pages of the book. How many pages are left to be read?
62. Write the number in the box such that
- $$\frac{3}{7} \times \text{□} = \frac{15}{98}$$
63. Will the quotient $7\frac{1}{6} \div 3\frac{2}{3}$ be a fraction greater than 1.5 or less than 1.5? Explain.
64. Describe two methods to compare $\frac{13}{17}$ and 0.82. Which do you think is easier and why?

Think and Discuss

1. **Give an example** of an addition problem that involves connecting an improper fraction in the final step.
2. **Explain** why $\frac{7}{9} + \frac{7}{9}$ does not equal $\frac{14}{18}$.

- 65. Health:** The directions for a pain reliever recommend that an adult of 60 kg and over take 4 tablets every 4 hours as needed, and an adult who weighs between 40 and 50 kg take only $2\frac{1}{2}$ tablets every 4 hours as needed. Each tablet weighs $\frac{4}{25}$ gram.
- (a) If a 72 kg adult takes 4 tablets, how many grams of pain reliever is he or she receiving?
- (b) How many grams of pain reliever is the recommended dose for an adult weighing 46 kg?
- 66. Animals:** The label on a bottle of pet vitamins lists dosage guidelines. What dosage would you give to each of these animals?
- (a) a 18 kg adult dog
- (b) a 6 kg cat
- (c) a 18 kg pregnant dog

Do Good Pet Vitamins

- Adult dogs:
 $\frac{1}{2}$ tsp (tea spoon full) per 9kg body weight
- Puppies, pregnant dogs, or nursing dogs:
 $\frac{1}{2}$ tsp per 4.5kg body weight
- Cats:
 $\frac{1}{4}$ tsp per 1kg body weight



- 67.** How many $\frac{1}{16}$ kg boxes of chocolates can be made with $1\frac{1}{2}$ kg chocolates?
- 68.** Anvi is making bookmarker like the one shown in Fig. 2.6. How many bookmarker can she make from a 15 m long ribbon?

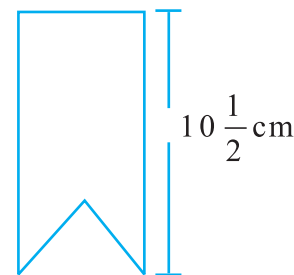


Fig. 2.6

69. A rule for finding the approximate length of diagonal of a square is to multiply the length of a side of the square by 1.414. Find the length of the diagonal when :
- (a) The length of a side of the square is 8.3 cm.
 (b) The length of a side of the square is exactly 7.875 cm.
70. The largest square that can be drawn in a circle has a side whose length is 0.707 times the diameter of the circle. By this rule, find the length of the side of such a square when the diameter of the circle is
 (a) 14.35 cm (b) 8.63 cm
71. To find the distance around a circular disc, multiply the diameter of the disc by 3.14. What is the distance around the disc when :
 (a) the diameter is 18.7 cm?
 (b) the radius is 6.45 cm?
72. What is the cost of 27.5 m of cloth at ₹ 53.50 per metre?
73. In a hurdle race, Nidhi is over hurdle B and $\frac{2}{6}$ of the way through the race, as shown in Fig. 2.7.

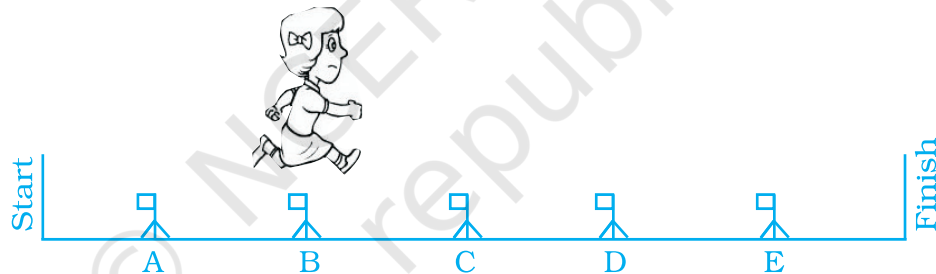


Fig. 2.7

Then, answer the following:

- (a) Where will Nidhi be, when she is $\frac{4}{6}$ of the way through the race?
- (b) Where will Nidhi be when she is $\frac{5}{6}$ of the way through the race?
- (c) Give two fractions to tell what part of the race Nidhi has finished when she is over hurdle C.
74. Diameter of Earth is 12756000m. In 1996, a new planet was discovered whose diameter is $\frac{5}{86}$ of the diameter of Earth. Find the diameter of this planet in km.
75. What is the product of $\frac{5}{129}$ and its reciprocal?

76. Simplify: $\frac{2\frac{1}{2} + \frac{1}{5}}{2\frac{1}{2} \div \frac{1}{5}}$

77. Simplify: $\frac{\frac{1}{4} + \frac{1}{5}}{1 - \frac{3}{8} \times \frac{3}{5}}$

78. Divide $\frac{3}{10}$ by $\left(\frac{1}{4} \text{ of } \frac{3}{5}\right)$

79. $\frac{1}{8}$ of a number equals $\frac{2}{5} \div \frac{1}{20}$. What is the number?

80. Heena's father paid an electric bill of ₹ 385.70 out of a 500 rupee note. How much change should he have received?

81. The normal body temperature is 98.6°F. When Savitri was ill her temperature rose to 103.1°F. How many degrees above normal was that?

Think and Discuss

1. **Name** the number of decimal places in the product of 5.625 and 2.75.
2. **Give an example** of two fractions whose product is an integer due to common factors.

82. **Meteorology:** One measure of average global temperature shows how each year varies from a base measure. The table shows results for several years.

Year	1958	1964	1965	1978	2002
Difference from Base	0.10°C	-0.17°C	-0.10°C	$\left(\frac{1}{50}\right)^\circ \text{C}$	0.54°C

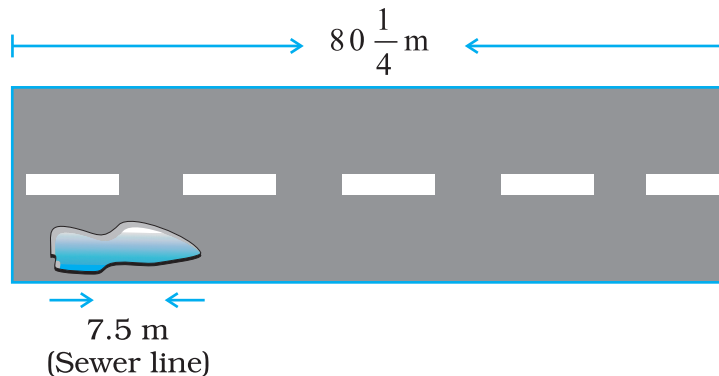
See the table and answer the following:

- (a) Order the five years from coldest to warmest.
- (b) In 1946, the average temperature varied by -0.03°C from the base measure. Between which two years should 1946 fall when the years are ordered from coldest to warmest?

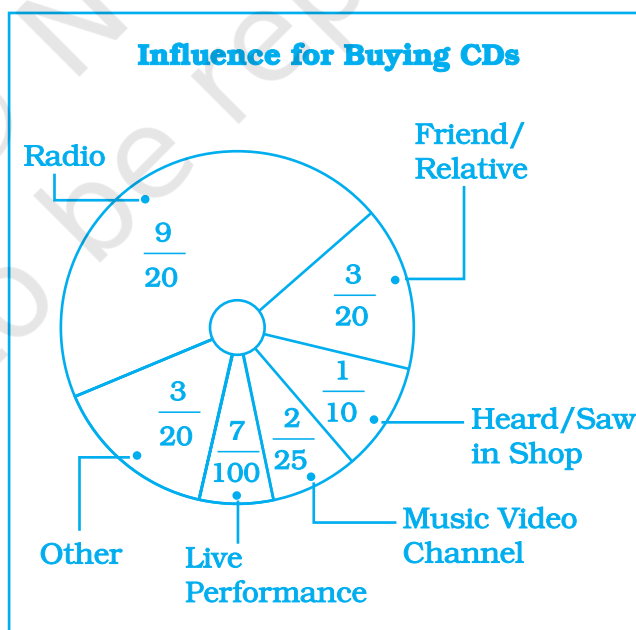
Science Application

- 83.** In her science class, Jyoti learned that the atomic weight of Helium is 4.0030; of Hydrogen is 1.0080; and of Oxygen is 16.0000. Find the difference between the atomic weights of:
- Oxygen and Hydrogen
 - Oxygen and Helium
 - Helium and Hydrogen
- 84.** Measurement made in science lab must be as accurate as possible. Ravi measured the length of an iron rod and said it was 19.34 cm long; Kamal said 19.25 cm; and Tabish said 19.27 cm. The correct length was 19.33 cm. How much of error was made by each of the boys?
- 85.** When 0.02964 is divided by 0.004, what will be the quotient?
- 86.** What number divided by 520 gives the same quotient as 85 divided by 0.625?
- 87.** A floor is 4.5 m long and 3.6 m wide. A 6 cm square tile costs ₹ 23.25. What will be the cost to cover the floor with these tiles?
- 88.** Sunita and Rehana want to make dresses for their dolls. Sunita has $\frac{3}{4}$ m of cloth, and she gave $\frac{1}{3}$ of it to Rehana. How much did Rehana have?
- 89.** A flower garden is 22.50 m long. Sheela wants to make a border along one side using bricks that are 0.25 m long. How many bricks will be needed?
- 90.** How much cloth will be used in making 6 shirts, if each required $2\frac{1}{4}$ m of cloth, allowing $\frac{1}{8}$ m for waste in cutting and finishing in each shirt?
- 91.** A picture hall has seats for 820 persons. At a recent film show, one usher guessed it was $\frac{3}{4}$ full, another that it was $\frac{2}{3}$ full. The ticket office reported 648 sales. Which usher (first or second) made the better guess?
- 92.** For the celebrating children's students of Class VII bought sweets for ₹ 740.25 and cold drink for ₹ 70. If 35 students contributed equally what amount was contributed by each student?
- 93.** The time taken by Rohan in five different races to run a distance of 500 m was 3.20 minutes, 3.37 minutes, 3.29 minutes, 3.17 minutes and 3.32 minutes. Find the average time taken by him in the races.

94. A public sewer line is being installed along $80\frac{1}{4}$ m of road. The supervisor says that the labourers will be able to complete 7.5 m in one day. How long will the project take to complete?



95. The weight of an object on moon is $\frac{1}{6}$ its weight on Earth. If an object weighs $5\frac{3}{5}$ kg on Earth, how much would it weigh on the moon?
96. In a survey, 200 students were asked what influenced them most to buy their latest CD. The results are shown in the circle graph.



- (a) How many students said radio influenced them most?
- (b) How many more students were influenced by radio than by a music video channel?
- (c) How many said a friend or relative influenced them or they heard the CD in a shop?

97. In the morning, a milkman filled $5\frac{1}{2}$ L of milk in his can. He sold to Renu, Kamla and Renuka $\frac{3}{4}$ L each; to Shadma he sold $\frac{7}{8}$ L; and to Jassi he gave $1\frac{1}{2}$ L. How much milk is left in the can?
98. Anuradha can do a piece of work in 6 hours. What part of the work can she do in 1 hour, in 5 hours, in 6 hours?
99. What portion of a 'saree' can Rehana paint in 1 hour if it requires 5 hours to paint the whole saree? In $4\frac{3}{5}$ hours? In $3\frac{1}{2}$ hours?
100. Rama has $6\frac{1}{4}$ kg of cotton wool for making pillows. If one pillow takes $1\frac{1}{4}$ kg, how many pillows can she make?
101. It takes $2\frac{1}{3}$ m of cloth to make a shirt. How many shirts can Radhika make from a piece of cloth $9\frac{1}{3}$ m long?
102. Ravi can walk $3\frac{1}{3}$ km in one hour. How long will it take him to walk to his office which is 10 km from his home?
103. Raj travels 360 km on three fifths of his petrol tank. How far would he travel at the same rate with a full tank of petrol?
104. Kajol has ₹ 75. This is $\frac{3}{8}$ of the amount she earned. How much did she earn?

Think and Discuss

1. **Explain** how you can be sure that a fraction is simplified.
2. **Give** the sign of a fraction in which the numerator is negative and the denominator is negative.

105. It takes 17 full specific type of trees to make one tonne of paper. If there are 221 such trees in a forest, then (i) what fraction of forest will be used to make;

(a) 5 tonnes of paper.

(b) 10 tonnes of paper.

(ii) To save $\frac{7}{13}$ part of the forest how much of paper we have to save.

106. Simplify and write the result in decimal form :

$$\left(1 \div \frac{2}{9}\right) + \left(1 \div 3\frac{1}{5}\right) + \left(1 \div 2\frac{2}{3}\right)$$

107. Some pictures (a) to (f) are given below. Tell which of them show:

(1) $2 \times \frac{1}{4}$

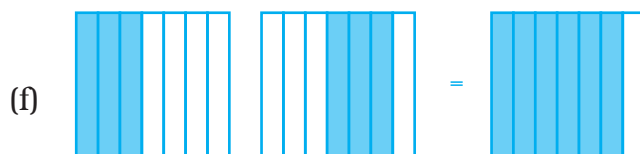
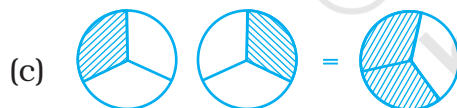
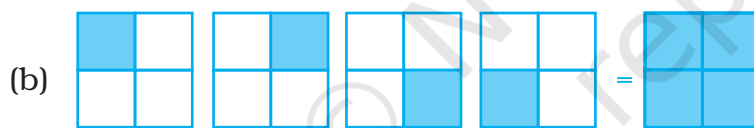
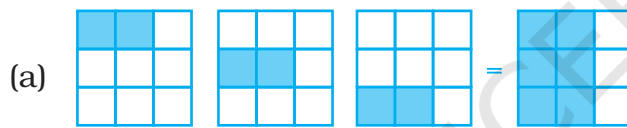
(2) $2 \times \frac{3}{7}$

(3) $2 \times \frac{1}{3}$

(4) $\frac{1}{4} \times 4$

(5) $3 \times \frac{2}{9}$

(6) $\frac{1}{4} \times 3$



108. Evaluate : $(0.3) \times (0.3) - (0.2) \times (0.2)$

109. Evaluate $\frac{0.6}{0.3} + \frac{0.16}{0.4}$

110. Find the value of : $\frac{(0.2 \times 0.14) + (0.5 \times 0.91)}{(0.1 \times 0.2)}$

111. A square and an equilateral triangle have a side in common. If side of triangle is $\frac{4}{3}$ cm long, find the perimeter of figure formed (Fig. 2.8).

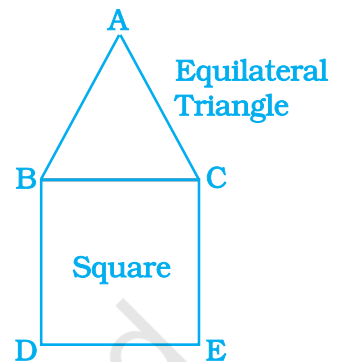


Fig. 2.8

112. Rita has bought a carpet of size $4 \text{ m} \times 6\frac{2}{3} \text{ m}$. But her room size is $3\frac{1}{3} \text{ m} \times 5\frac{1}{3} \text{ m}$. What fraction of area should be cut off to fit wall to wall carpet into the room?

113. Family photograph has length $14\frac{2}{5} \text{ cm}$ and breadth $10\frac{2}{5} \text{ cm}$. It has border of uniform width $2\frac{3}{5} \text{ cm}$. Find the area of framed photograph.

114. Cost of a burger is ₹ $20\frac{3}{4}$ and of Macpuff is ₹ $15\frac{1}{2}$. Find the cost of 4 burgers and 14 macpuffs.

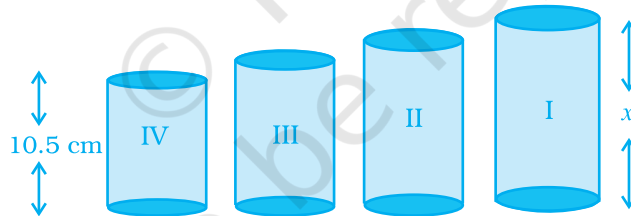
115. A hill, $101\frac{1}{3} \text{ m}$ in height, has $\frac{1}{4}$ th of its height under water. What is the height of the hill visible above the water?

116. *Sports:* Reaction time measures how quickly a runner reacts to the starter pistol. In the 100 m dash at the 2004 Olympic Games, Lauryn Williams had a reaction time of 0.214 second. Her total race time, including reaction time, was 11.03 seconds. How long did it take her to run the actual distance?

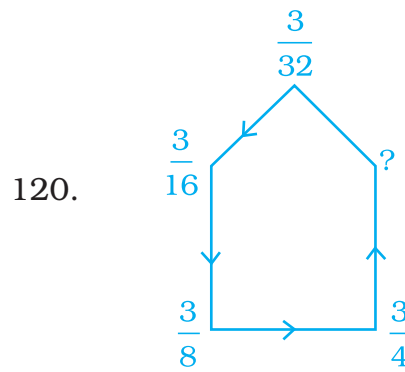
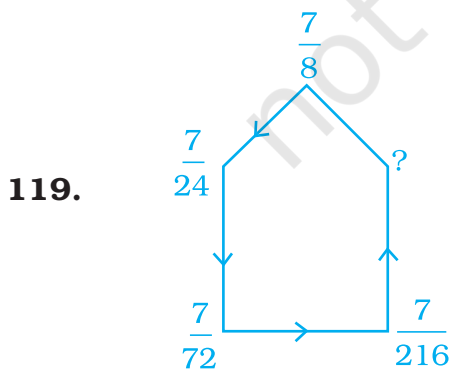
117. State whether the answer is greater than 1 or less than 1. Put a '✓' mark in appropriate box.

Questions	Greater than 1	Less than 1
$\frac{2}{3} \div \frac{1}{2}$		
$\frac{2}{3} \div \frac{2}{1}$		
$6 \div \frac{1}{4}$		
$\frac{1}{5} \div \frac{1}{2}$		
$4\frac{1}{3} \div 3\frac{1}{2}$		
$\frac{2}{3} \times 8\frac{1}{2}$		

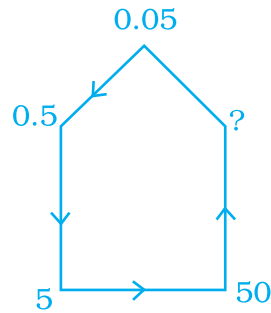
118. There are four containers that are arranged in the ascending order of their heights. If the height of the smallest container given in the figure is expressed as $\frac{7}{25}x = 10.5$ cm. Find the height of the largest container.



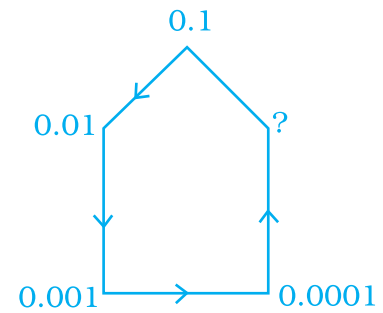
In Questions 119 to 122, replace '?' with appropriate fraction.



121.



122.

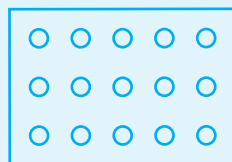


What is the Error in each of question 123 to 125?

123. A student compared $-\frac{1}{4}$ and -0.3 . He changed $-\frac{1}{4}$ to the decimal -0.25 and wrote, "Since 0.3 is greater than 0.25 , -0.3 is greater than -0.25 ". What was the student's error?
124. A student multiplied two mixed fractions in the following manner: $2\frac{4}{7} \times 3\frac{1}{4} = 6\frac{1}{7}$. What error the student has done?
125. In the pattern $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \dots$ which fraction makes the sum greater than 1 (first time)? Explain.

(D) Applications

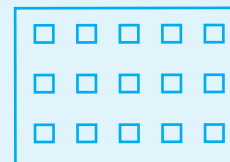
- Game 1:** Shade (i) $\frac{1}{3}$ of the circles in box (a)
 (ii) $\frac{2}{5}$ of the triangles in box (b)
 (iii) $\frac{1}{5}$ of the squares in box (c)



(a)



(b)



(c)

UNIT 3

DATA HANDLING

(A) Main Concepts and Results

- The information collected in the form of numbers is called **Data**.
- Data is organised and represented graphically so that it becomes easy to understand and interpret.
- The difference between the highest and lowest observations in a given data is called its **Range**.
- The average or **Arithmetic Mean** or mean of a given data is defined as :

$$\text{Mean} = \frac{\text{Sum of all observations}}{\text{Number of observations}}$$

- **Mode** is the observation that occurs most frequently in the data.
- If each of the values in a data are occurring one time (or equal number of times), then all are mode. Sometimes, we also say that this data has no mode since none of them is occurring frequently.
- When the given data is arranged in ascending (or descending) order, then the middle most observation is the **median** of the data.
- Mean, median and mode are the representative values of a group of observations. They are also called the **measures of central tendency** of the data.
- The representation of the data in the form of rectangles (bars) of uniform width is called a **Bar Graph**.
- A **double bar graph** can be used to compare informations related to two data.
- The situation that may or may not happen, have a chance of happening.

- The probability of an event which is certain to happen is '1'.
- The probability of an event which is impossible to happen is '0'.
- The probability of an event

$$= \frac{\text{Number of outcomes favourable to the event}}{\text{Total number of outcomes in the experiment}}$$

(B) Solved Examples

In Examples 1 to 3, there are four options, out of which only one is correct. Write the correct answer.

Example 1: The range of the data 14, 6, 12, 17, 21, 10, 4, 3 is
 (a) 21 (b) 17 (c) 18 (d) 11

Solution: Correct answer is (c)

Example 2: The mode of the data 23, 26, 22, 29, 23, 29, 26, 29, 22, 23 is
 (a) 23 and 29 (b) 23 only
 (c) 29 only (d) 26 only

Solution: Correct answer is (a)

Example 3: The median of the data 40, 50, 99, 68, 98, 60, 94 is
 (a) 40 (b) 60
 (c) 68 (d) 99

Solution: Correct answer is (c)

In Examples 4 and 5, fill in the blanks to make the statements true.

Example 4: The mean of first five prime numbers is _____.

Solution: 5.6

[Hint : First five prime numbers are 2, 3, 5, 7 and 11]

Example 5: The probability of getting a number greater than 2 on throwing a die once is _____.

Solution: $\frac{2}{3}$

In Examples 6, 7 and 8, state whether the statements are True or False .

Example 6: The mode of the observations 23, 26, 15, 12, 28, 38, 19, 23, 26, 23 is 28.

Solution: False.

Example 7:

Size of Sweater	Number of Sweaters Sold
40	15
42	17
44	13
46	14
48	11
Total	70

In the above table

- (a) The most popular size is 17.
 (b) 17 is the median for above data.

Solution:

(a) False

(The numbers of sweater 17 tells us that 42 is the most common size. Thus, 17 is not mode rather 42 is mode.)

(b) False

Example 8: Median of the data:

4, 5, 9, 2, 6, 8, 7 is 2

Solution:

False

Example 9: Find the median of the data:

3, 11, 7, 2, 5, 9, 9, 2, 10, 15, 7

Solution:

Arranging in ascending order.

2, 2, 3, 5, 7, 7, 9, 9, 10, 11, 15

Since number of observations is odd, the middle most value is the median. The middle most value is 7, so median is 7.

Example 10: Find the median of the data :

21, 15, 6, 25, 18, 13, 20, 9, 8, 12

Solution: Arranging in ascending order :

6, 8, 9, 12, 13, 15, 18, 20, 21, 25

Since number of observations is even, the median is given by finding the average or mean of the two middle most observations:

$$\text{So, median} = \frac{13+15}{2} = \frac{28}{2} = 14$$

Note : In this data, there are two middle most terms 13 and 15. So, median is the average of these observations.

Example 11: The cards bearing letters of the word “MATHEMATICS” are placed in a bag. A card is taken out from the bag without looking into the bag (at random).

- (a) How many outcomes are possible when a letter is taken out of the bag at random?
- (b) What is the probability of getting
 - (i) M?
 - (ii) Any vowel?
 - (iii) Any consonant?
 - (iv) X?

Solution: (a) There are 11 outcomes namely M, M, A, A, T, T, H, E, I, C, S.

(b) (i) Probability of getting 'M' = $\frac{2}{11}$

(ii) Probability of getting a vowel = $\frac{4}{11}$

(iii) Probability of getting a consonant = $\frac{7}{11}$

(iv) Probability of getting X = $0 = \frac{0}{11}$

Example 12: If the mean of 26, 28, 25, x , 24 is 27, find the value of x .

Solution: Mean = $\frac{\text{Sum of all observations}}{\text{Number of observations}}$

$$\text{or, } 27 = \frac{26 + 28 + 25 + x + 24}{5}$$

$$\text{or, } 27 = \frac{103 + x}{5}$$

$$\text{or, } 135 = 103 + x$$

$$\text{or, } x = 135 - 103$$

$$\text{So, } x = 32$$

Example 13: The mean of 10 observations was calculated as 40. It was detected on rechecking that the value of 45 was wrongly copied as 15. Find the correct mean.

Solution: Mean = $\frac{\text{Sum of all observations}}{\text{Number of observations}}$

$$\text{or, } 40 = \frac{\text{Sum of all observations}}{10}$$

So, sum of all observations = 400

But this is incorrect sum, since one observation was copied wrongly.

$$\begin{aligned} \text{So, correct sum} &= \text{Incorrect sum} - \text{Incorrect} \\ &\quad \text{observation} + \text{correct observation} \\ &= 400 - 15 + 45 \\ &= 430 \end{aligned}$$

$$\text{Correct Mean} = \frac{\text{Correct Sum}}{\text{Number of observations}} = \frac{430}{10} = 43$$

Example 14: The median of observations 11, 12, 14, 18, $x + 2$, 20, 22, 25, 61 arranged in ascending order is 21. Find the value of x .

Solution: Median from data = $x + 2$

$$\text{or, } 21 = x + 2$$

$$\text{or, } x = 21 - 2$$

$$\text{or, } x = 19$$

Example 15: Study the double bar graph given below and answer the questions that follow:

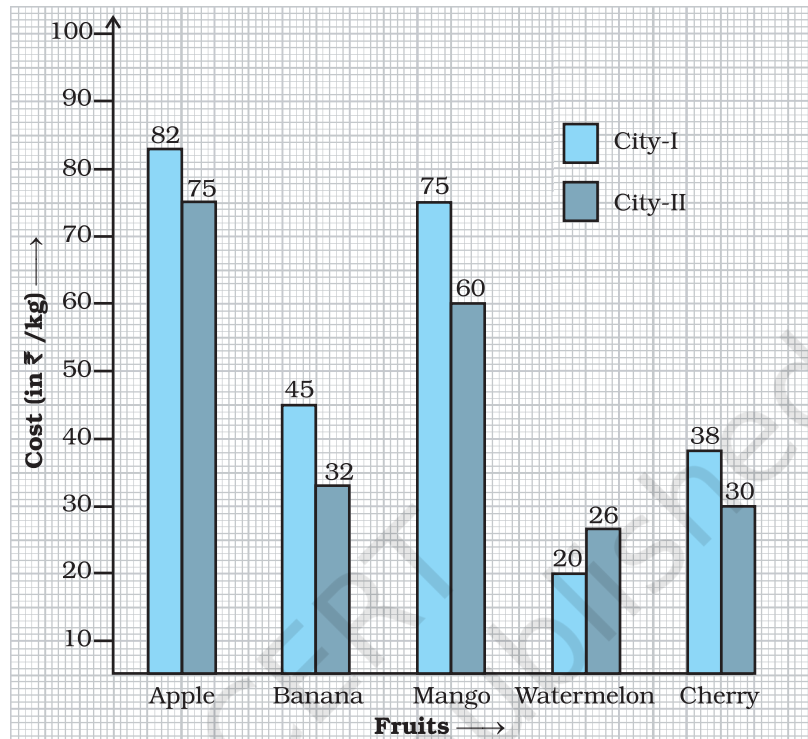


Fig. 3.1

- What information does the above double graph depict?
- Name the fruits for which cost of 1 kg is greater in City I as compared to City II.
- What is the difference of rates for apples in both the cities?
- Find the ratio of the cost of mangoes per kg in City I to the cost of mangoes per kg in City II.

Solution:

- The double bar graph compares the cost of different fruits per kg in Cities I and II.
- Apple, Banana, Mango and Cherry.
- Since ₹ 82 – ₹ 75 = ₹ 7 therefore, in both the cities the difference of rates of apples is ₹ 7/kg.
- ₹ 75 : ₹ 60 = 5 : 4

Example 16: The following double bar graph represents test matches results summary for Cricket Team of country X against different countries:

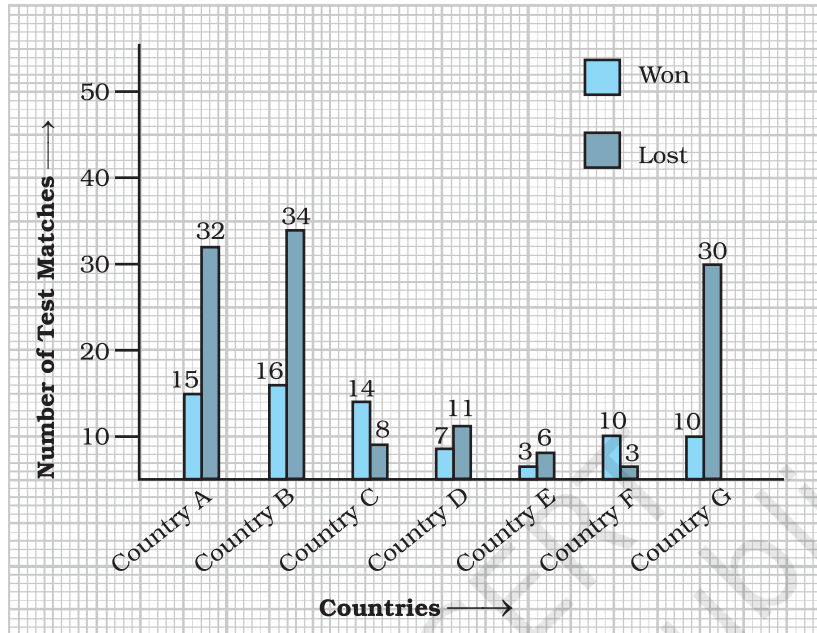


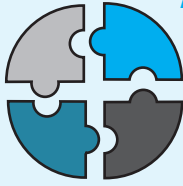
Fig. 3.2

Use the bar graph to answer the following questions:

- Which country has managed maximum wins against country X?
- The difference between the number of matches won and lost is highest for which country against country X?
- Number of wins of country E is the same as number of losses of which country against country X?

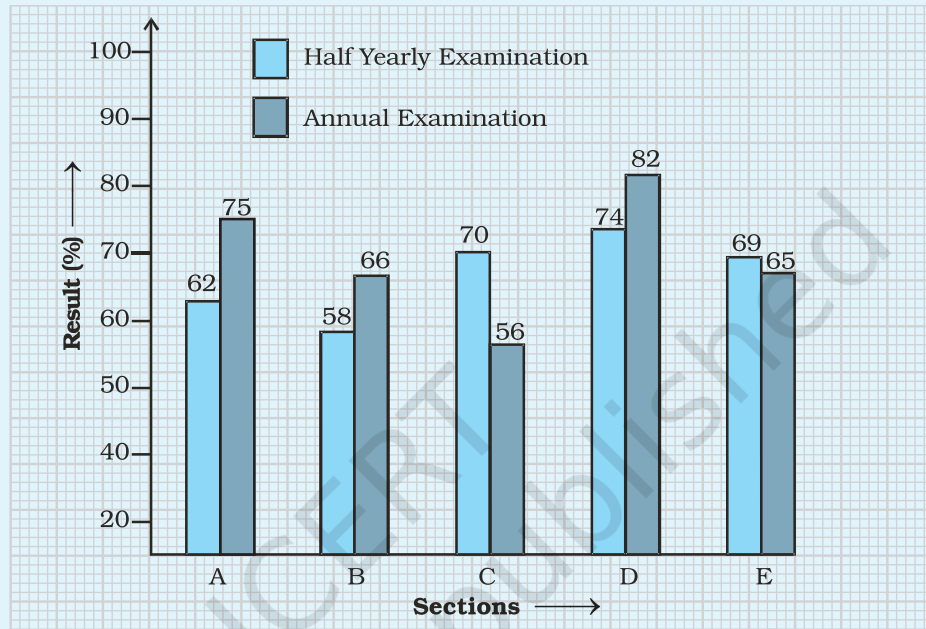
Solution: (a) Country B (b) Country G (c) Country F

Application on Problem Solving Strategy



Example 17

The double bar graph given below compares the class-averages in half yearly and annual examinations of 5 sections of Class VII.



Observe the graph carefully and tell which section showed the most improvement and by how much?

Solution:



Understand and Explore the Problem

- What information is given in the question?

The average result of half yearly and annual examinations of 5 different sections of Class VII are compared.

- What are you trying to find?

The section of Class VII that has showed the most improvement and the per cent of improvement shown.



Plan a Strategy

- Observe the graph and find out the sections in which the annual examination result is more than the half yearly result.

Improvement is in these sections only.

- Then only for these sections, compare the results graphically and locate the section for which the difference of results is the maximum.
- For this section, find the difference of the results.

**Solve**

- The sections in which the results of annual examination is more than half yearly examination are sections A, B and D.
- Observing the graph of these sections we locate that section A has the maximum difference between the results.

The difference of results of section A = $75 - 62 = 13$

Hence, section A has shown the maximum improvement and it is 13 per cent.

**Revise**

- Find the difference of the annual examination results and the half yearly examination results for each section.

$$\text{Difference in results of section A} = 75 - 62 = 13$$

$$\text{Difference in results of section B} = 66 - 58 = 8$$

$$\text{Difference in results of section C} = 56 - 70 = -14$$

$$\text{Difference in results of section D} = 82 - 74 = 8$$

$$\text{Difference in results of section E} = 65 - 69 = -4$$

We see that the difference is maximum for Section A and the difference is 13, which is same as our answer.



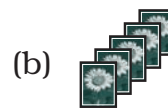
Think and Discuss

1. **Can you compare** the ratio of difference of results of Sections B and D?
2. **From the graph**, can you observe the sections where there was no improvement?

(C) EXERCISE

In Questions 1 to 16, there are four options, out of which only one is correct. Write the correct answer.

- Let x, y, z be three observations. The mean of these observations is
 - $\frac{x \times y \times z}{3}$
 - $\frac{x + y + z}{3}$
 - $\frac{x - y - z}{3}$
 - $\frac{x \times y + z}{3}$
- The number of trees in different parks of a city are 33, 38, 48, 33, 34, 34, 33 and 24. The mode of this data is
 - 24
 - 34
 - 33
 - 48
- Which measures of central tendency get affected if the extreme observations on both the ends of a data arranged in descending order are removed?
 - Mean and mode
 - Mean and Median
 - Mode and Median
 - Mean, Median and Mode
- The range of the data : 21, 6, 17, 18, 12, 8, 4, 13 is
 - 17
 - 12
 - 8
 - 15
- The median of the data : 3, 4, 5, 6, 7, 3, 4 is
 - 5
 - 3
 - 4
 - 6
- Out of 5 brands of chocolates in a shop, a boy has to purchase the brand which is most liked by children. What measure of central tendency would be most appropriate if the data is provided to him?
 - Mean
 - Mode
 - Median
 - Any of the three
- There are 2 aces in each of the given set of cards placed face down. From which set are you certain to pick the two aces in the first go?



8. In the previous question, what is the probability of picking up an ace from set (d)?
- (a) $\frac{1}{6}$ (b) $\frac{2}{6}$ (c) $\frac{3}{6}$ (d) $\frac{4}{6}$
9. The difference between the highest and the lowest observations in a data is its
- (a) frequency (b) width (c) range (d) mode
10. In a school, only 2 out of 5 students can participate in a quiz. What is the chance that a student picked at random makes it to the competition?
- (a) 20% (b) 40% (c) 50% (d) 30%
11. Some integers are marked on a board. What is the range of these integers?
- (a) 31 (b) 37
(c) 20 (d) 3
12. On tossing a coin, the outcome is
- (a) only head
(b) only tail
(c) neither head nor tail
(d) either head or tail
13. The mean of three numbers is 40. All the three numbers are different natural numbers. If lowest is 19, what could be highest possible number of remaining two numbers?
- (a) 81 (b) 40 (c) 100 (d) 71
14. Khilona earned scores of 97, 73 and 88 respectively in her first three examinations. If she scored 80 in the fourth examination, then her average score will be
- (a) increased by 1 (b) increased by 1.5
(c) decreased by 1 (d) decreased by 1.5
15. Which measure of central tendency best represents the data of the most popular politician after a debate?
- (a) Mean (b) Median
(c) Mode (d) Any of the above

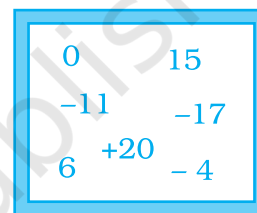


Fig. 3.3

- 16.** Which of the following has the same mean, median and mode?
- (a) 6, 2, 5, 4, 3, 4, 1 (b) 4, 2, 2, 1, 3, 2, 3
- (c) 2, 3, 7, 3, 8, 3, 2 (d) 4, 3, 4, 3, 4, 6, 4

In Questions 17 to 31, fill in the blanks to make the statements true.

- 17.** The difference between the highest and the lowest observations of a data is called _____.
- 18.** The mean of a data is defined as _____.
- 19.** In a set of observations, the observation that occurs the most often is called _____.
- 20.** In a given data, arranged in ascending or descending order, the middle most observation is called _____.
- 21.** Mean, Median, Mode are the measures of _____.
- 22.** The probability of an event which is certain to happen is _____.
- 23.** The probability of an event which is impossible to happen is _____.
- 24.** When a die is thrown, the probability of getting a number less than 7 is _____.
- 25.** In Throwing a die the number of possible outcomes is _____.
- 26.** _____ can be used to compare two collections of data.
- 27.** The representation of data with bars of uniform width is called _____.
- 28.** If the arithmetic mean of 8, 4, x , 6, 2, 7 is 5, then the value of x is _____.
- 29.** The median of any data lies between the _____ and _____ observations.
- 30.** Median is one of the observations in the data if number of observations is _____.

Think and Discuss

What is the difference between a bar graph and a histogram.

31. Rohit collected the data regarding weights of students of his class and prepared the following table:

Weight (in kg)	44 – 47	48 – 51	52 – 55	56 – 60
Number of Students	3	5	25	7

A student is to be selected randomly from his class for some competition. The probability of selection of the student is highest whose weight is in the interval _____.

In Questions 32 to 49, state whether the statements are True or False.

32. If a die is thrown, the probability of getting a number greater than 6 is 1.
33. When a coin is tossed, there are 2 possible outcomes.
34. If the extreme observations on both the ends of a data arranged in ascending order are removed, the median gets affected.
35. The measures of central tendency may not lie between the maximum and minimum values of data.
36. It is impossible to get a sum of 14 of the numbers on both dice when a pair of dice is thrown together.
37. The probability of the spinning arrow stopping in the shaded region (Fig. 3.4) is $\frac{1}{2}$.
38. A coin is tossed 15 times and the outcomes are recorded as follows :
H T T H T H H H T T H T H T T. The chance of occurrence of a head is 50 per cent.
39. Mean, Median and Mode may be the same for some data.
40. The probability of getting an ace out of a deck of cards is greater than 1.
41. Mean of the data is always from the given data.
42. Median of the data may or may not be from the given data.
43. Mode of the data is always from the given data.
44. Mean of the observations can be lesser than each of the observations.
45. Mean can never be a fraction.

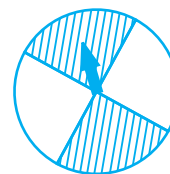


Fig. 3.4

- 46.** Range of the data is always from the data.
- 47.** The data 12, 13, 14, 15, 16 has every observation as mode.
- 48.** The range of the data 2, -5, 4, 3, 7, 6 would change if 2 was subtracted from each value in the data.
- 49.** The range of the data 3, 7, 1, -2, 2, 6, -3, -5 would change if 8 was added to each value in the data.
- 50.** Calculate the Mean, Median and Mode of the following data:
5, 10, 10, 12, 13.
Are these three equal ?
- 51.** Find the mean of the first ten even natural numbers.
- 52.** A data constitutes of heights (in cm) of 50 children. What do you understand by mode for the data?
- 53.** A car seller collects the following data of cars sold in his shop.

Colour of Car	Number of Cars Sold
Red	15
Black	20
White	17
Silver	12
Others	9

- (a) Which colour of the car is most liked?
(b) Which measure of central tendency was used in (a)?
- 54.** The marks in a subject for 12 students are as follows:
31, 37, 35, 38, 42, 23, 17, 18, 35, 25, 35, 29
For the given data, find the
(a) Range (b) Mean (c) Median (d) Mode
- 55.** The following are weights (in kg) of 12 people.
70, 62, 54, 57, 62, 84, 75, 59, 62, 65, 78, 60
(a) Find the mean of the weights of the people.

- (b) How many people weigh above the mean weight?
- (c) Find the range of the given data.

56. Following cards are put facing down:



What is the chance of drawing out

- (a) a vowel
 - (b) A or I
 - (c) a card marked U
 - (d) a consonant
57. For the given data given below, calculate the mean of its median and mode.

6, 2, 5, 4, 3, 4, 4, 2, 3

58. Find the median of the given data if the mean is 4.5.

5, 7, 7, 8, x, 5, 4, 3, 1, 2

59. What is the probability of the sun setting tomorrow?

60. When a spinner with three colours (Fig. 3.5) is rotated, which colour has more chance to show up with arrow than the others?

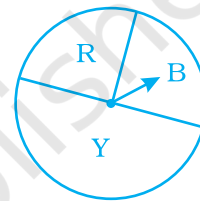


Fig. 3.5

61. What is the probability that a student chosen at random out of 3 girls and 4 boys is a boy?

62. The letters written on paper slips of the word MEDIAN are put in a bag. If one slip is drawn randomly, what is the probability that it bears the letter D?

63. Classify the following events as certain to happen, impossible to happen, may or may not happen:

- (a) Getting a number less than 1 on throwing a die.
- (b) Getting head when a coin is tossed.
- (c) A team winning the match.
- (d) Christmas will be on 25 December.
- (e) Today moon will not revolve around the earth.
- (f) A ball thrown up in the air will fall down after some time.

64. A die was thrown 15 times and the outcomes recorded were

5, 3, 4, 1, 2, 6, 4, 2, 2, 3, 1, 5, 6, 1, 2

Find the mean, median and mode of the data.

65. Find the mean of first six multiples of 4.

66. Find the median of first nine even natural numbers.

- 67.** The mean of three numbers is 10. The mean of other four numbers is 12. Find the mean of all the numbers.
- 68.** Find the mode of the given data:
10, 8, 4, 7, 8, 11, 15, 8, 4, 2, 3, 6, 8
- 69.** Given below are heights of 15 boys of a class measured in cm:
128, 144, 146, 143, 136, 142, 138, 129, 140, 152, 144, 140, 150, 142, 154.
Find
(a) The height of the tallest boy.
(b) The height of the shortest boy.
(c) The range of the given data.
(d) The median height of the boys.
- 70.** Observe the data and answer the questions that follow:
16, 15, 16, 16, 8, 15, 17
(a) Which data value can be put in the data so that the mode remains the same?
(b) At least how many and which value(s) must be put in to change the mode to 15?
(c) What is the least number of data values that must be put in to change the mode to 17? Name them.
- 71.** Age (in years) of 6 children of two groups are recorded as below:

Age (in Years)	
Group A	Group B
7	7
7	9
9	11
8	12
10	12
10	12

- (a) Find the mode and range for each group.
(b) Find the range and mode if the two groups are combined together.

Measures of central tendency are used to describe the middle of a data set. Mean, median, and mode are measures of central tendency.

Measures of Central Tendency and Range	
Description	
Mean	To find the mean (average), add the values in the data set. Then divide by the number of values in the set.
Median	The middle value or the mean of the two middle values, in an ordered (ascending or descending) set of data.
Mode	The value(s) that occur most frequently.
Range	The difference between the least and the greatest values in a data set.

72. Observe the given bar graph carefully and answer the questions that follow.

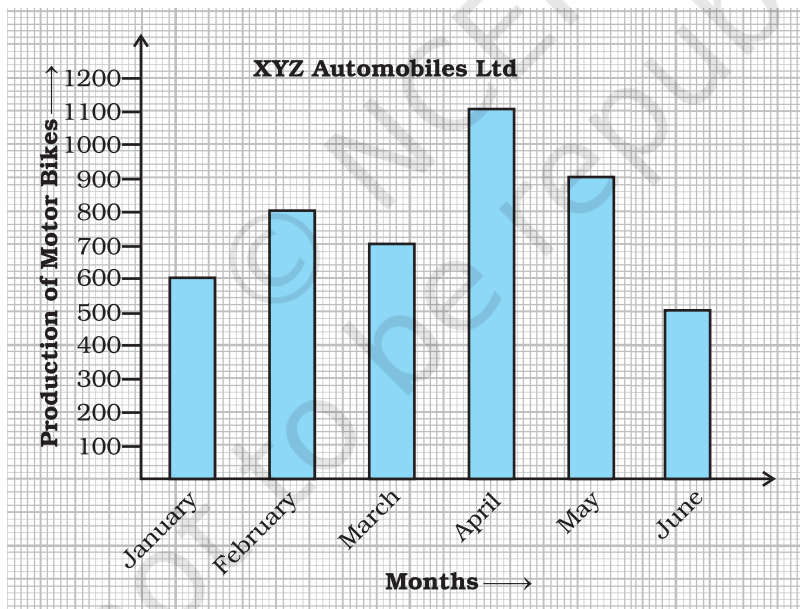


Fig. 3.6

- What information does the bar graph depict?
- How many motor bikes were produced in the first three months?
- Calculate the increase in production in May over the production in January.

- (d) In which month the production was minimum and what was it?
- (e) Calculate the average (mean) production of bikes in 6 months.

73. The bar graph given below shows the marks of students of a class in a particular subject:

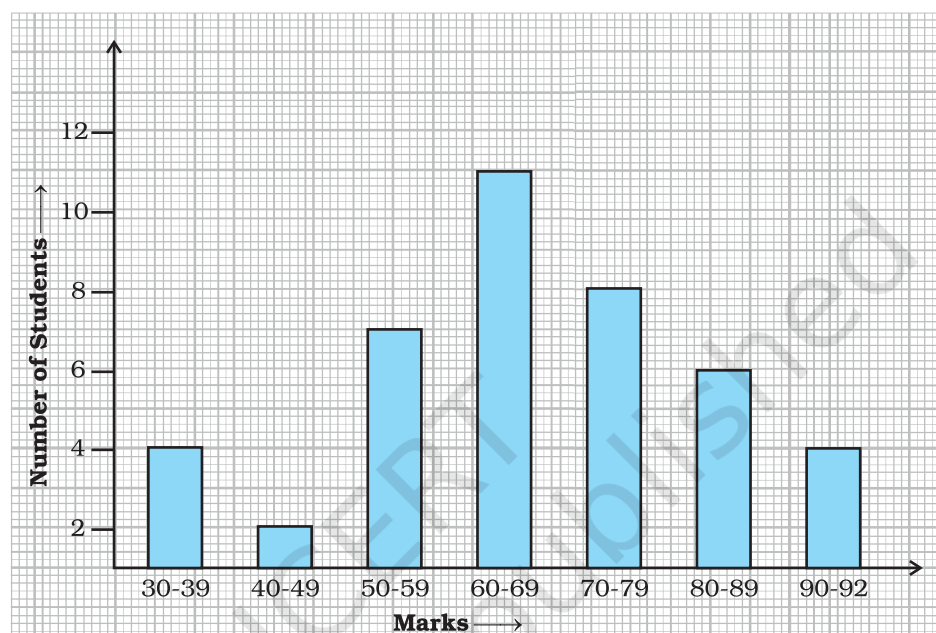


Fig. 3.7

Study the bar graph and answer the following questions:

- (a) If 40 is the pass mark, then how many students have failed?
- (b) How many students got marks from 50 to 69?
- (c) How many students scored 90 marks and above?
- (d) If students who scored marks above 80 are given merits then how many merit holders are there?
- (e) What is the strength of the class?

74. Study the bar graph given below and answer the questions that follow.

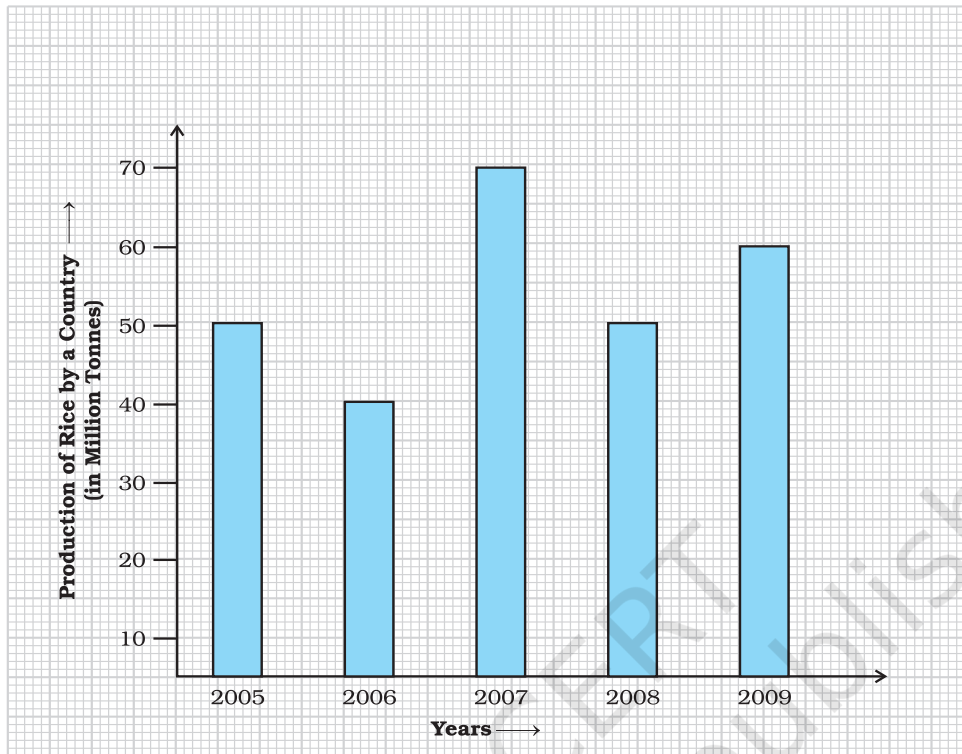
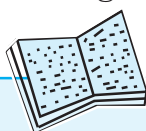


Fig. 3.8

- What information does the above bar graph represent?
- In which year was production the least?
- After which year was the maximum rise in the production?
- Find the average production of rice during the 5 years.
- Find difference of rice production between years 2006 and 2008.

Vocabulary Connections

To become familiar with some of the vocabulary terms in the chapter, fill up the following:



Vocabulary

1. The population of an area is the total number of people living in that area. What might _____ mean in the process of gathering data?
2. The word median is derived from the Latin word medius, meaning “middle.” What might the _____ value in a set of data be?
3. When you sample a food, you taste a small portion. What might a _____ be in data collection?

- Population
- Median
- Sample

75. Study the bar graph given below and answer the questions that follow :

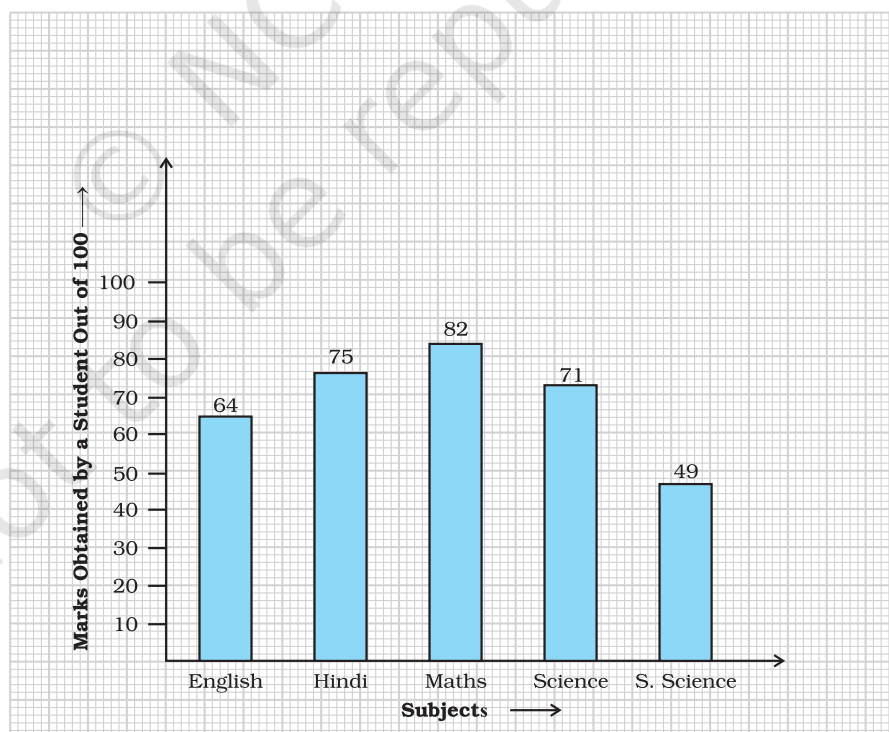


Fig. 3.9

- What information is depicted from the bar graph?
- In which subject is the student very good?
- Calculate the average marks of the student.
- If 75 and above marks denote a distinction, then name the subjects in which the student got distinction.
- Calculate the percentage of marks the student got out of 500.

76. The bar graph given below represents the circulation of newspapers (dailies) in a town in six languages (the figures are approximated to hundreds).

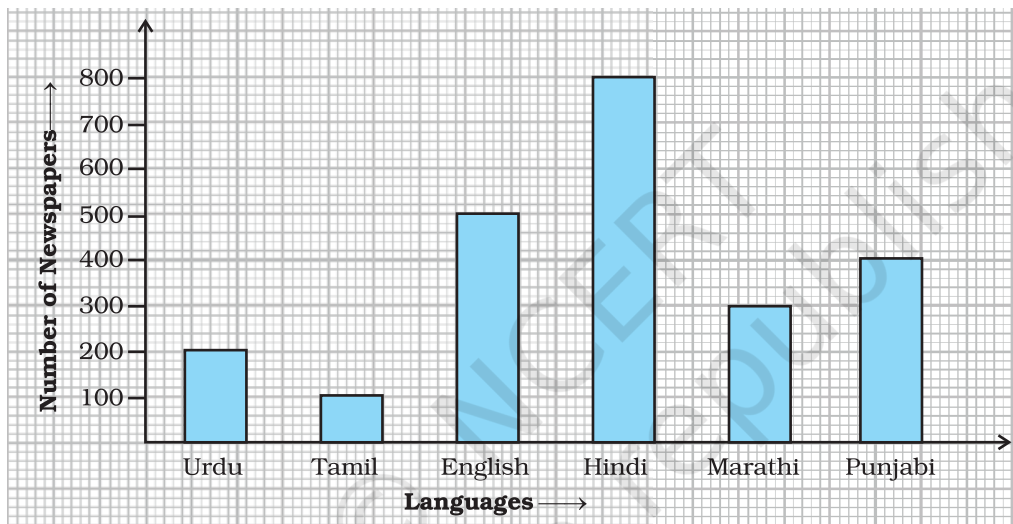


Fig. 3.10

Study the bar graph and answer the following questions:

- Find the total number of newspapers read in Hindi, Punjabi, Urdu, Marathi and Tamil.
- Find the excess number of newspapers read in Hindi than those in English.
- Name the language in which the least number of newspapers are read.
- Write the total circulation of newspapers in the town.

77. Study the double bar graphs given below and answer the following questions:

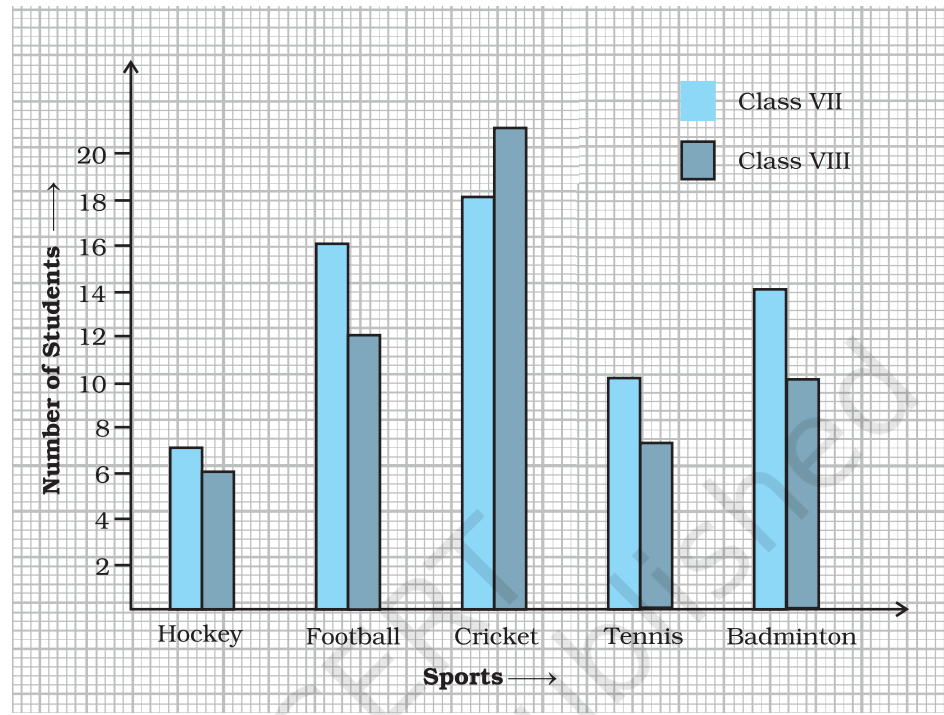


Fig. 3.11

- Which sport is liked the most by Class VIII students?
- How many students of Class VII like Hockey and Tennis in all?
- How many students are there in Class VII?
- For which sport is the number of students of Class VII less than that of Class VIII?
- For how many sports students of Class VIII are less than Class VII?
- Find the ratio of students who like Badminton in Class VII to students who like Tennis in Class VIII.

78. Study the double bar graph shown below and answer the questions that follow:

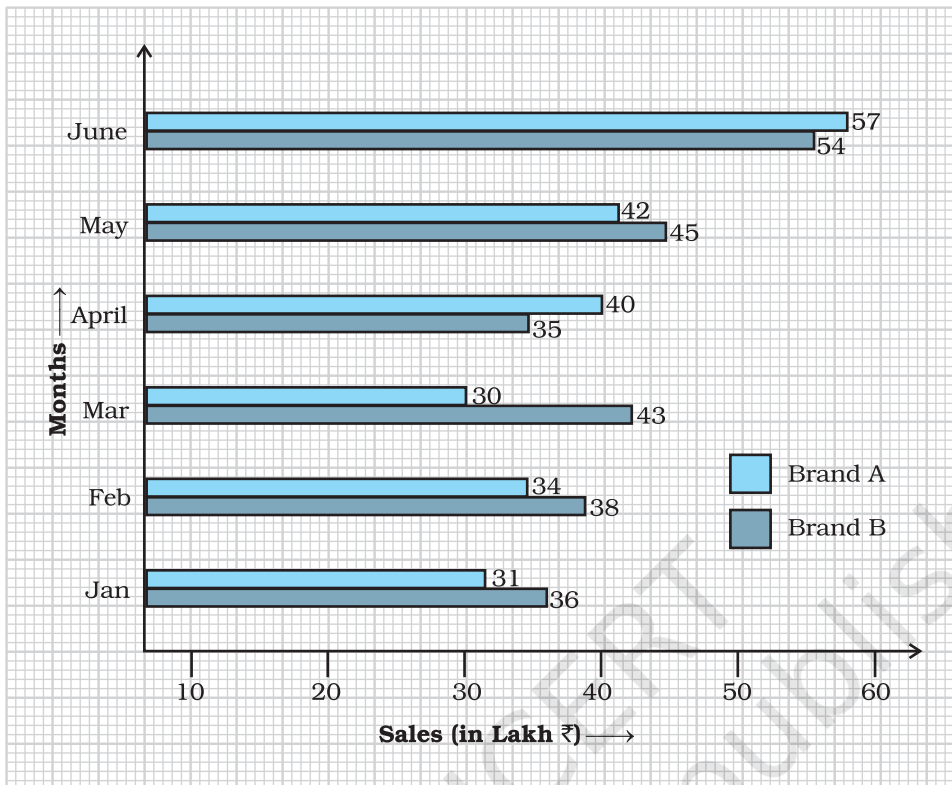


Fig. 3.12

- What information is represented by the above double bar graph?
- In which month sales of Brand A decreased as compared to the previous month?
- What is the difference in sales of both the Brands for the month of June?
- Find the average sales of Brand B for the six months.
- List all months for which the sales of Brand B was less than that of Brand A.
- Find the ratio of sales of Brand A as compared to Brand B for the month of January.

79. Study the double bar graph given below and answer the questions that follow:

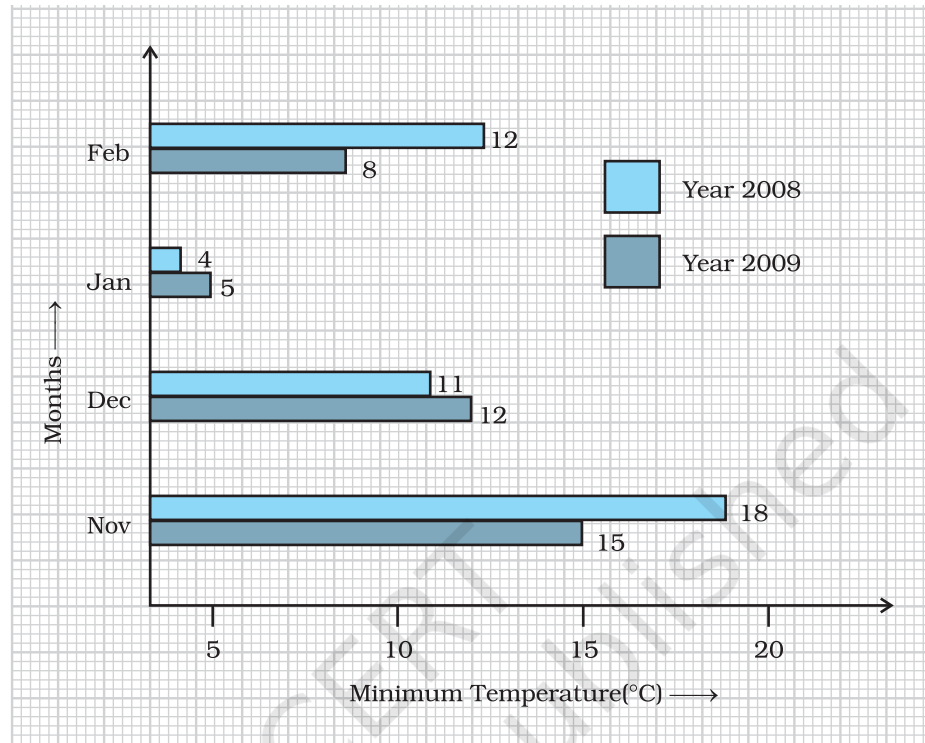


Fig. 3.13

- What information is compared in the above given double bar graph?
 - Calculate the ratio of minimum temperatures in the year 2008 to the year 2009 for the month of November.
 - For how many months was the minimum temperature in the year 2008 greater than that of year 2009? Name those months.
 - Find the average minimum temperature for the year 2008 for the four months.
 - In which month is the variation in the two temperatures maximum?
80. The following table shows the average intake of nutrients in calories by rural and urban groups in a particular year. Using a suitable scale for the given data, draw a double bar graph to compare the data.

Foodstuff	Rural	Urban
Pulses	35	49
Leafy vegetables	14	21
Other vegetables	51	89
Fruits	35	66
Milk	70	250
Fish and flesh foods	10	22
Fats and Oils	9	35
Sugar/Jaggery	19	31

81. Study the double bar graph and answer the questions that follow:

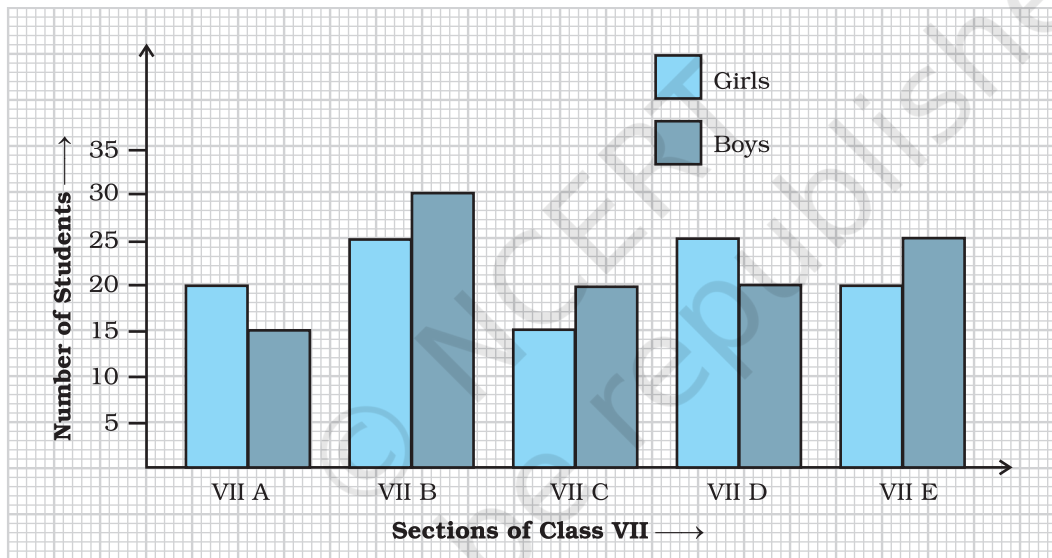


Fig. 3.14

- What information does the double bar graph represent?
- Find the total number of boys in all sections of Class VII.
- In which sections, the number of girls is greater than the number of boys?
- In which section, the number of boys is the maximum?
- In which section, the number of girls is the least?

- 82.** In a public library, the following observations were recorded by the librarian in a particular week:

Days	Mon	Tues	Wed	Thurs	Fri	Sat
Newspaper Readers	400	600	350	550	500	350
Magazine Readers	150	100	200	300	250	200

- (a) Draw a double bar graph choosing an appropriate scale.
 (b) On which day, the number of readers in the library was maximum?
 (c) What is the mean number of magazine readers?
- 83.** Observe the following data:

Government School, Chandpur		
Daily Attendance		Date : 15.4.2009
Class	Total Students	Number of Students Present on that Day
VI	90	81
VII	82	76
VIII	95	91
IX	70	65
X	63	62

- (a) Draw a double bar graph choosing an appropriate scale. What do you infer from the bar graph?
 (b) Which class has the maximum number of students?
 (c) In which class, the difference of total students and number of students present is minimum?
 (d) Find the ratio of number of students present to the total number of students of Class IX.
 (e) What per cent of Class VI students were absent?



Plan a Strategy

- Identify too much/too little Information.

When you read a problem, you must decide if the problem has too much or too little information. If the problem has too much information, you must decide what information to use to solve the problem. If the problem has too little information, then you should determine what additional information you need to solve the problem.

- Read the problems below and decide if there is too much or too little information in each problem. If there is too much information, tell what information you would use to solve the problem. If there is too little information, tell what additional information you would need to solve the problem.
- On Monday, 20 students took an examination. There were 10 students who scored above 85 and 10 students who scored below 85. What was the average score?
 - Aayesha is practising for a marathon. She ran for 50 minutes on Monday, 70 minutes on Wednesday, and 45 minutes on Friday. On Tuesday and Thursday, she lifted weights at the gym for 45 minutes each day. She swam for 45 minutes over the weekend. What was the average amount of time per day Aayesha spent running last week?

84. Observe the given data:

Days of the Week	Mon	Tues	Wed	Thurs	Fri	Sat
Number of Mobile Phone Sets Sold	50	45	30	55	27	60

- Draw a bar graph to represent the above given information.
- On which day of the week was the sales maximum?
- Find the total sales during the week.
- Find the ratio of the minimum sale to the maximum sale.
- Calculate the average sale during the week.
- On how many days of the week was the sale above the average sales?

85. Below is a list of 10 tallest buildings in India.

This list ranks buildings in India that stand at least 150m (492 ft.) tall, based on standard height measurement. This includes spires and architectural details but does not include antenna marks. Following data is given as per the available information till 2009. Since new buildings are always under construction, go on-line to check new taller buildings.

Use the information given in the table about sky scrapers to answer the following questions:

Name	City	Height	Floors	Year
Planet	Mumbai	181m	51	2009
UB Tower	Bengaluru	184 m	20	2006
Ashok Towers	Mumbai	193 m	49	2009
The Imperial I	Mumbai	249 m	60	2009
The Imperial II	Mumbai	249 m	60	2009
RNA Mirage	Mumbai	180 m	40	2009
Oberoi Woods Tower I	Mumbai	170 m	40	2009
Oberoi Woods Tower II	Mumbai	170 m	40	2009
Oberoi Woods Tower III	Mumbai	170 m	40	2009
MVRDC	Mumbai	156 m	35	2002

(a) Find the height of each storey of the three tallest buildings and write them in the following table:

Building	Height	Number of Storeys	Height of Each Storey

(b) The average height of one storey for the buildings given in (a) is _____.

(c) Which city in this list has the largest percentage of skyscrapers? What is the percentage?

(d) What is the range of data?

(e) Find the median of the data.

(f) Draw a bar graph for given data.

86. The marks out of 100 obtained by Kunal and Soni in the Half Yearly Examination are given below:

Subjects	English	Hindi	Maths	Science	S. Science	Sanskrit
Kunal	72	81	92	96	64	85
Soni	86	89	90	82	75	82

- Draw a double bar graph by choosing appropriate scale.
 - Calculate the total percentage of marks obtained by Soni.
 - Calculate the total percentage of marks obtained by Kunal.
 - Compare the percentages of marks obtained by Kunal and Soni.
 - In how many subjects did Soni get more marks than Kunal? Which are those subjects?
 - Who got more marks in S. Science and what was the difference of marks?
 - In which subject the difference of marks was maximum and by how much?
87. The students of Class VII have to choose one club from Music, Dance, Yoga, Dramatics, Fine arts and Electronics clubs. The data given below shows the choices made by girls and boys of the class. Study the table and answer the questions that follow:

Clubs	Music	Dance	Yoga	Dramatics	Fine Arts	Electronics
Girls	15	24	10	19	27	21
Boys	12	16	8	17	11	30

- Draw a double bar graph using appropriate scale to depict the above data.
- How many students are there in Class VII?
- Which is the most preferred club by boys?
- Which is the least preferred club by girls?
- For which club the difference between boys and girls is the least?
- For which club is the difference between boys and girls the maximum?

- 88.** The data given below shows the production of motor bikes in a factory for some months of two consecutive years.

Months	Feb	May	August	October	December
2008	2700	3200	6000	5000	4200
2007	2800	4500	4800	4800	5200

Study the table given above and answer the following questions:

- Draw a double bar graph using appropriate scale to depict the above information and compare them.
 - In which year was the total output the maximum?
 - Find the mean production for the year 2007.
 - For which month was the difference between the production for the two years the maximum?
 - In which month for the year 2008, the production was the maximum?
 - In which month for the year 2007, the production was the least?
- 89.** The table below compares the population (in hundreds) of 4 towns over two years:

Towns	A	B	C	D
2007	2900	6400	8300	4600
2009	3200	7500	9200	6300

Study the table and answer the following questions:

- Draw a double bar graph using appropriate scale to depict the above information.
 - In which town was the population growth maximum?
 - In which town was the population growth least?
- 90.** The table below gives the data of tourists visiting 5 hill stations over two consecutive years. Study the table and answer the questions that follow:

Hill stations	Nainital	Shimla	Manali	Mussoorie	Kullu
2008	4000	5200	3700	5800	3500
2009	4800	4500	4200	6200	4600

- Draw a double bar graph to depict the above information using appropriate scale.

- (b) Which hill station was visited by the maximum number of tourists in 2008?
- (c) Which hill station was visited by the least number of tourists in 2009?
- (d) In which hill stations was there increase in number of tourists in the year 2009?

91. The table below gives the flavours of ice cream liked by children (boys and girls) of a society.

Flavours	Vanilla	Chocolate	Strawberry	Mango	Butterscotch
Boys	4	9	3	8	13
Girls	8	12	7	9	10

Study the table and answer the following questions:

- (a) Draw a double bar graph using appropriate scale to represent the above information.
- (b) Which flavour is liked the most by the boys?
- (c) How many girls are there in all?
- (d) How many children like chocolate flavour of ice cream?
- (e) Find the ratio of children who like strawberry flavour to vanilla flavour of ice cream.

(D) Applications

Application 1: Create a table like the one shown

Object	Estimate (in cm)	Measure (in cm)
Length of a pen		
Length of an eraser		
Length of your palm		
Length of your geometry box		
Length of your math notebook		

Draw a double bar graph for the above. How accurate are your estimations?

Application 2: The Body Mass Index (BMI) is a statistical measurement which compares an individual's weight and height. It is a very useful tool to estimate a healthy body weight based on how tall an individual is. Indeed, it is the most widely used tool to identify the weight problem. BMI is very easy to measure and evaluate. With the help of BMI, one can come to know whether one is underweight, normal weight, over weight or in the category of obesity. Its value is measured in kg/m^2 .

BMI of any individual is calculated with the help of the following formula :

$$\text{Body Mass Index (BMI)} = \left(\frac{\text{Body Weight}}{\text{Height} \times \text{Height}} \right)$$

Here the weight of the individual is measured in kilograms and the height of that individual is taken in metres.

The categories in BMI are given in the following table :

Category	BMI
Under weight	<18.5
Normal weight	18.5 – 24.9
Over weight	25.0 – 29.9
Obesity Class I	30.0 – 34.9
Obesity Class II	35.0 – 39.9
Obesity Class III	≥ 40

After having a glance at the table given above, one can come to know the category in which any individual falls. Now fill the table given below using the data for the children of your class :

Sl. No.	Name of Student	Body Weight (in kg)	Height (in mtrs)	Value (BMI)	Category

Also draw a bar graph for the data received.

Game 3: Collect the data from students of your class about their favourite programmes on television and prepare a table as shown below:

Sl.No.	Programmes	Number of Girls	Number of Boys
1.	Cartoons		
2.	Serials		
3.	Reality shows		
4.	Songs		
5.	Movies		
6.	News		
7.	Others		

- Represent the above information on a double bar graph using appropriate scale.
- Study the graph and find out the favourite programme of the most of students.
- Which programme is liked by most of the boys?
- Name the programme for which difference between likings of the number of boys and girls is the maximum.
- Calculate the percentage of boys who like to watch News.
- Calculate the percentage of girls who like to watch Cartoons.

Game 4: Throw a die 20 times and record the outcomes in the following table:

No. on Die	1	2	3	4	5	6
No. of Times (Frequency)						

Calculate the probability of getting the following numbers using your recorded data:

- 6
- greater than 6
- 3 or 4

Write about your observation about the certainty of getting any particular number by throwing a die.

Cross Word Puzzle 5

Solve the given crossword and then fill up the given blanks and then boxes. Clues are given below for across as well as downward filling. Also for across and down clues. Clue number is written at the corner of boxes. Answers of clues have to fill up their respective boxes.

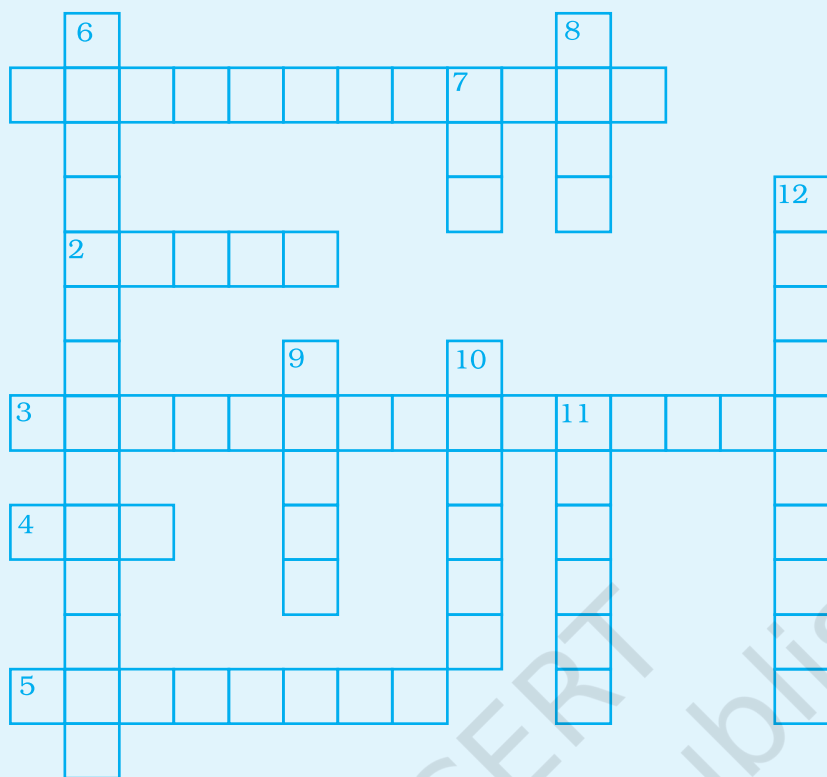
Clues

Across

1. Arranging the collected data in tabular form is called _____ of data.
2. Mean is defined as sum of all observations divided by _____ number of observations.
3. Mean, median and mode are collectively known as measures of _____.
4. Throwing a die gives _____ possible outcomes.
5. A _____ is the representation of data using bars of uniform width and varying heights.

Down

6. The most common representative value of a group of data is the _____.
7. Tossing a coin gives _____ outcomes.
8. The observation that occurs most often is called the _____.
9. The difference between the highest and lowest observations gives the _____.
10. _____ gives the middle observation of a given data.
11. A _____ bar graph helps in comparing two collections of data at a glance.
12. The number of times each observation occurs can be represented by _____.



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