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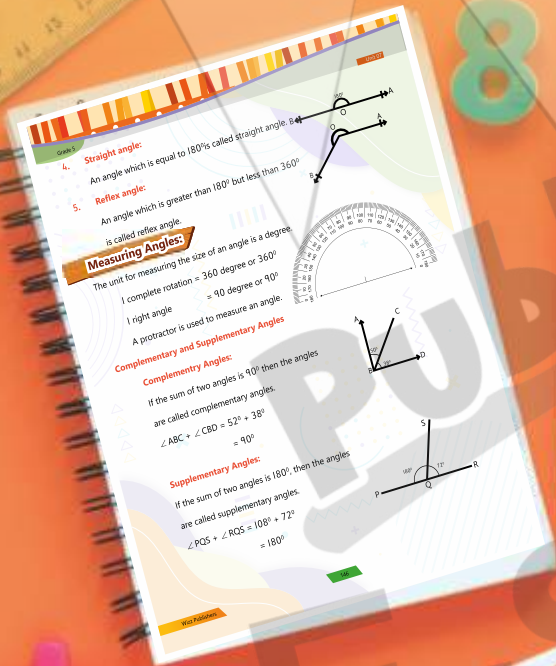
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Wizz

Mathematics

WORKBOOK SERIES
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WIZZ MATHEMATICS[®] SERIES

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PREFACE

Wizz Mathematics Series has been designed by a team of professional authors and educators having more than two decades of teaching experience to their credit. It is aligned with the Single National Curriculum, 2020 and aims at sharpening the holistic development of children through learner-centered approach. The series:

- Guides students in a very simple way how to solve the cognitive tasks by creating a comfortable zone.
- Encourages students to practice concepts with maximum practice space.
- Involves students in interactive exercises and activities.
- Helps students create a natural space for thinking through well-planned activities.

WHY WIZZ MATHEMATICS SERIES?

Wizz Mathematics Series is the best choice for students because it is:

- Backed by practical experience and critical analysis of over 25 years.
- Developed, designed and printed with the latest and modern techniques.
- Available at economical prices keeping in view the post Covid-19 economic crisis.
- Based on well-planned activities and systematically developed exercises.
- Helpful for students to develop the 21st century life skills for a bright future.

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Unit 1

Whole Numbers and Operations

Students Learning Outcomes

- Read numbers up to 1,000,000 (one million) in numerals and words.
- Write numbers up to 1,000,000 (one million) in numerals and words.
- Add numbers up to 6-digit numbers.
- Subtract numbers up to 6-digit numbers.
- Multiply numbers, up to 5-digit, by 10, 100 and 1000.
- Multiply numbers, up to 5-digit, by a number up to 3-digit numbers.
- Divide a number up to 5-digit numbers by 10, 100 and 1000.
- Divide numbers up to 5-digit numbers by a number up to 2-digit numbers.
- Solve real life situations involving operation of addition, subtraction, multiplication and division.
- Identify and apply a pattern rule to determine missing elements for a given pattern.
- Identify the pattern rule of a given increasing and decreasing pattern and extend the pattern for the next three terms.
- Describe the pattern found in a given table or chart.



Unit 1

Whole Numbers and Operations



Numerals

Writing Numerals in Millions

If we have a number 8,450,361

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Units
8	4	5	0	3	6	1

We write as

M	H.Th	T.Th	Th	H	T	U
8	4	5	0	3	6	1

So "8,450,361" is read as

Eight million, four hundred fifty thousand three hundred and sixty one.

Write the following in numerals

- i. Sixty thousand, five hundred and ten. _____
- ii. Ninety - two thousand, one hundred and eighty. _____
- iii. Eleven thousand and six hundred. _____
- iv. Six hundred three thousand, three hundred and seventy. _____
- v. One hundred one thousand, eight hundred and nine. _____
- vi. Four hundred thousand and four. _____
- vii. Five hundred nine thousand, and twenty - nine. _____

Write the following in words

- i. 6,300 _____

- ii. 34,001 _____

- iii. 78,202 _____

- iv. 933,133 _____

- v. 581,006 _____

- vi. 7,332,106 _____

- vii. 495,523 _____

Place Value

Every digit has its particular value, according to its place in numeral.

Example:

Million, Hundred-thousand Ten-thousand Thousand, Hundred Tens
Unit

7 , 4 3 3 , 5 4 6

OR

$$7433546 = 7,000,000 + 400,000 + 30,000 + 3000 + 500 + 40 + 6$$



What does the digit in colour stand for in the numerals?

i. 4,334,5**6**

ii. **3**,121,236

iii. 1,**8**09,207

iv. 324,33**3**

v. 1,7**4**1,269

vi. 96**4**,900

Write the numbers in expanded form.

i. 249,444

ii. 34,835

iii. 400,194

iv. 9115

v. 376,214

vi. 114,270

vii. 2,858,467

Activity

Write the following in numerals. First one has been done for you.

i. Six hundred and thirty four thousand.

634,000

ii. Five hundred, four thousand and twenty.

iii. One million and sixty - three thousand.

iv. Three million, one hundred thousand, nine hundred and seventy.

v. Eight million, three hundred forty one thousand, five hundred and sixty - three.

Fill in the blanks with the correct numbers.

$$705,210 = \underline{\hspace{2cm}} + 5000 + 200 + 10$$

$$260,703 = 200,000 + \underline{\hspace{2cm}} + 700 + 3$$

$$596,180 = 500,000 + 90,000 + \underline{\hspace{2cm}} + 100 + 80$$

$$2,321,096 = \underline{\hspace{2cm}} + 300,000 + 20,000 + 1000 + 90 + 6$$

$$9,320,123 = 9,000,000 + \underline{\hspace{2cm}} + 20,000 + 100 + 20 + 3$$

Write the place values.

- i. In 5,405,302, the digit 4 stands for _____
- ii. In 405,675, the digit 6 stands for _____
- iii. In 8631,425, the digit 8 stands for _____

Comparison of Numbers**Compare the numbers, write ">" or "<" in the boxes.**

- | | | | |
|------|-----------|----------------------|-----------|
| i. | 853,625 | <input type="text"/> | 678,323 |
| ii. | 3,245,123 | <input type="text"/> | 5,154,378 |
| iii. | 911,266 | <input type="text"/> | 1,000,549 |
| iv. | 3,143,032 | <input type="text"/> | 3,142,903 |
| v. | 3,034,324 | <input type="text"/> | 5,375,424 |

Write "T" for true and "F" for a false statement.

- i. 75,441 is greater than 70,441. _____
- ii. 9,447,663 is greater than 447,663. _____
- iii. 313,909 is less than 313,009. _____
- iv. 470,010 is greater than 470,000. _____
- v. 8,718 is less than 8,018. _____
- iv. 943,737 is less than 943,730. _____
- v. 594,112 is greater than 94,112. _____
- vi. 9,345,567 is less than 345,567. _____
- vii. 4,431,119 is greater than 4,430,119. _____

Consider the number 365,092.

- i. The digit at the hundreds place is _____.
- ii. The digit 5 is at the thousands place and its value is _____.
- iii. The digit 6 is at the _____ place.
- iv. The digit at the ten thousands place is _____.
- v. The digit 9 is at the tens place and its value is _____.

A factory produces 465,678 bulbs in a week.

- i. Write in words.

- ii. Write in expanded form.

- iii. Write place value of each digit.

The area of our country Pakistan is 881,913 km².

- i. Write in words.

- ii. Write in expanded form.

iii. Write place value of each digit.

Addition

Properties of Addition

1. Commutative Property

Two numbers can be added in any order their sum is always the same

Example:

$$5 + 7 = 12 \text{ and } 7 + 5 = 12$$

So $5 + 7 = 7 + 5$



2. Associative Property

To add three numbers we may first add any two of them and add the third to the sum.

Example:

$$(4 + 5) + 6 = 9 + 6 = 15$$

and $4 + (5 + 6) = 4 + 11 = 15$

So, $(4 + 5) + 6 = 4 + (5 + 6)$



3. Additive Identity

When 0 is added to any number the result is the number itself. Thus '0' is called the additive identity.

Example:

$$5 + 0 = 5, 0 + 38 = 38$$



Complete the following.

$$2 + (3 + 5) = (\square + 3) + \square$$

$$8 + (7 + 9) = (8 + \square) + 9$$

$$11 + (\square + 8) = (\square + 9) + \square$$

$$\square + (11 + \square) = (7 + \square) + 12$$

$$5 + (12 + 15) = (\square + \square) + \square$$

$$5 + 0 = \square$$

$$\square + 0 = 75$$

$$91 + \square = 91$$

Complete it.

i. $81 + 83 = 83 + \underline{\hspace{2cm}}$

ii. $50 + 75 = 75 + \underline{\hspace{2cm}}$

iii. $47 + 60 = \underline{\hspace{2cm}} + 47$

iv. $208 + 269 = \underline{\hspace{2cm}} + 208$

v. $344 + 585 = \underline{\hspace{2cm}} + 344$

Addition

i. $6566 + 3566$

ii. $84 + 897 + 2998$

iii. $82,112 + 65,874$

iv. $78,478 + 63,425$

v. $476 + 889 + 901 + 8044$

vi. $807,506 + 24,709$

vii. $70,336 + 53,650$

viii. $573,126 + 616,971$

ix. $9000 + 675 + 30,109 + 7684$

x. $8350 + 8945 + 888,098 + 3259$

Word Problems

- i. A shopkeeper sold 288 eggs to a confectionery, 332 eggs to a bakery and 100 eggs to a hotel. How many eggs did he sell altogether?

- ii. A publishing company sold 65,456 printed books and 745,849 electronic books in a year. How many books were sold all over the year?

- iii. Mr. Qasim drove 349 km on Friday, 405 km on Saturday and 169 km on Sunday. How many kilometers did he drive on these days?

- iv. A shoe factory manufactured 65,950 shoes in October and 48,380 shoes in November. How many shoes were manufactured in these two months?

- v. There were 1550 mango trees. 2585 banana trees. 4276 guava trees and 1578 orange trees in a farm. How many trees were there altogether?

Subtraction

Properties of subtraction:

1. A large number cannot be subtracted from a smaller number.
2. Addition and subtraction are interrelated.

Example:

$$8 - 3 = 5$$
$$3 + 5 = 8$$



3. When a smaller number is subtracted from a larger number, the result is always a smaller than the number from which subtraction is done.

Example:

The difference of 6 and 2 is 4.
 $6 - 2 = 4$



4. When 0 is subtracted from any number, the result is the number itself.

Example:

$$28 - 0 = 28$$



Subtraction

i. $96,329 - 80,763$

ii. $395,108 - 165,439$

iii. $902,430 - 97,989$

iv. $780,201 - 698,199$

v. $36,716 - 913,234$

vi. $47,915 - 512,012$

vii. $419,871 - 980,125$

viii. $289,129 - 325,011$

Word Problems

- i. Mr. Mubeen wants to buy a new car which costs Rs. 835,698. He has Rs. 465,786 in his bank account. How much more money does he need?

- ii. In a garden of rose and jasmine flowers, there are 543,793 total flowers. If there are 323,450 flowers of jasmine, then how many flowers are roses?

- iii. Nazia had Rs. 7540. She bought a dress for Rs. 5799. What amount is left with her?

- iv. Lahore has a population of 459,814 in one town and 325,919 in the other town. What is the difference between their population?

Fill in the blanks.

1. _____ means "is equal to".
2. _____ means "is less than".
3. _____ means "is greater than".
4. When _____ is added to any other number, the result is the number itself.
5. In commutative property two numbers can be added in any order. Their sum is always the _____.
6. $344 + 585 = \text{_____} + 344$.
7. A large number cannot be subtracted from a _____ number.
8. When _____ is subtracted from any number, the result is the number itself.
9. Addition and _____ are interrelated.
10. _____ is called the additive identity.

Multiplication

Properties of Multiplication:

1. Basics of multiplication:

$$4 \times 5 = 20$$

This means that 4 fives are equal to 20 or $5+5+5+5 = 20$.

2. Commutative Property:

When two numbers are multiplied in any order, their product is always the same.



Example:

$$4 \times 3 = 12 \text{ and } 3 \times 4 = 12$$

3. Associative Property:

When we are multiplying more than two numbers. We can always change the grouping and get the same product.

Example:

$$(5 \times 7) \times 10 = 35 \times 10 = 350$$

$$5(7 \times 10) = 5 \times 70 = 350$$

$$(5 \times 10) \times 7 = 50 \times 7 = 350$$

**4. The Multiplication-Addition principle:**

When we multiply, we can break apart the numbers into smaller value.

**Example:**

$$7 \times 8 = 7 \times (5 + 3)$$

$$= (7 \times 5) + (7 \times 3) = 35 + 21 = 56$$

5. Multiplicative Identity:

When a number is multiplied by 1, the product is the number itself 1 is known as the multiplicative identity.

**Example:**

$$1 \times 27 = 27$$

6. The product of 0 and any number is always 0.**Example:**

$$0 \times 19 = 0$$



Find the missing factors.

i. $12 \times \boxed{} = 60$

iii. $8 \times \boxed{} = 72$

ii. $\boxed{} \times 20 = 80$

iv. $\boxed{} \times 80 = 160$

Write in missing numerals.

i. $2 \times 3 = \square \times 2$

iii. $\square \times 9 = \square \times 2$

ii. $7 \times 5 = 5 \times \square$

iv. $11 \times \square = 5 \times \square$

Multiply the following.

i. $173 \times 10 =$ _____

ii. $65 \times 100 =$ _____

iii. $3116 \times 1000 =$ _____

iv. $462 \times 1000 =$ _____

v. $118 \times 400 =$ _____

vi. $24 \times 300 =$ _____

vii. $1033 \times 500 =$ _____

viii. $872 \times 800 =$ _____

ix. $980 \times 500 =$ _____

x. $460 \times 200 =$ _____

xi. $110 \times 80 =$ _____

xii. $55 \times 100 =$ _____

Fill in the missing numbers.

i. $16 \times \square = 1600$

ii. $314 \times \square = 3140$

iii. $270 \times \square = 27000$

iv. $888 \times \square = 888000$

v. $\square \times 51 = 51000$

vi. $\square \times 4400 = 440000$

vii. $58 \times 2000 = \square$

viii. $314 \times 300 = \square$

ix. $2201 \times 4000 = \square$

x. $673 \times 9000 = \square$

xi. $561 \times 5000 = \square$

xii. $1123 \times 7000 = \square$

Find the product of.

i. $\begin{array}{r} 48 \\ \times 54 \\ \hline \end{array}$

ii. $\begin{array}{r} 55 \\ \times 16 \\ \hline \end{array}$

iii. $\begin{array}{r} 25 \\ \times 55 \\ \hline \end{array}$

iv. $\begin{array}{r} 92 \\ \times 77 \\ \hline \end{array}$

v. $\begin{array}{r} 75 \\ \times 34 \\ \hline \end{array}$

vi. $\begin{array}{r} 63 \\ \times 19 \\ \hline \end{array}$

vii. $\begin{array}{r} 14 \\ \times 42 \\ \hline \end{array}$

viii. $\begin{array}{r} 39 \\ \times 66 \\ \hline \end{array}$

Multiply these:

i. 593×882

ii. 221×793

iii. 8609×231

iv. 196×414

v. 5298×452

vi. 3087×670

vii. 3768×583

viii. 2292×812

ix. 301×171

x. 978×659

Assignment

A. Solve these:

a. 475×10

b. 149×10

c. 863×40

d. 592×70

e. 311×30

f. 676×100

g. 513×100

h. 298×200

i. 7200×500

j. 9500×900

k. 695×1000

l. 987×1000

m. 312×3000

n. 741×2000

o. 1201×7000

B. Multiply the given numbers by 10, 100 and 1000.

a. 65

b. 12

c. 814

d. 967

e. 3214

f. 9673

Word Problems

- i. A factory canteen charges each worker Rs 15 for lunch. What amount does it collect from 850 workers?

- ii. A teacher collected Rs 65 from each pupil as examination fee. What amount did she collect from 98 pupils?

- iii. A farmer planted 280 rows of sweet potatoes with 25 plants in each row. How many plants did he plant altogether?

- iv. An aeroplane can carry 235 passengers in a trip. If it makes 13 trips in a week. How many passengers does it carry per week?

- v. A washing machine cost Rs 26,524. Find the cost of 37 such washing machines?

Division

Properties of division:

1. **Basics of division:** $8 \div 2 = 4$

This means 2 is contained 4 times in 8.

8 is called the dividend, 2 is called the divisor, 4 is called the quotient.

2. **The divisor and the quotient can be interchanged.**

$$30 \div 5 = 6 \quad \text{and} \quad 30 \div 6 = 5$$

3. **Multiplication is related to division, when we divide the product by one factor, we get the other factor.**

Example:

$$9 \times 7 = 63 \text{ so } 63 \div 7 = 9 \text{ and } 63 \div 9 = 7$$



Fill in the blanks with correct numbers.

i. $96 \div \boxed{} = 12$

ii. $78 \div \boxed{} = 6$

iii. $\boxed{} \div 4 = 44$

iv. $\boxed{} \div 8 = 54$

v. $189 \div \boxed{} = 27$

vi. $234 \div \boxed{} = 39$

Divide these directly:

i. $30 \div 10 = \underline{\hspace{2cm}}$

ii. $450 \div 10 = \underline{\hspace{2cm}}$

iii. $1700 \div 100 = \underline{\hspace{2cm}}$

iv. $400 \div 100 = \underline{\hspace{2cm}}$

v. $6300 \div 100 = \underline{\hspace{2cm}}$

vi. $8100 \div 100 = \underline{\hspace{2cm}}$

vii. $8000 \div 1000 = \underline{\hspace{2cm}}$

viii. $37000 \div 1000 = \underline{\hspace{2cm}}$

ix. $730 \div 10 = \underline{\hspace{2cm}}$

x. $8600 \div 100 = \underline{\hspace{2cm}}$

Divide the following

i. $4248 \div 59$

ii. $3570 \div 42$

iii. $8908 \div 68$

iv. $5193 \div 27$

v. $60,105 \div 81$

vi. $23,649 \div 99$

vii. $48,384 \div 72$

viii. $16,901 \div 64$

ix. $57,104 \div 36$

x. $124,878 \div 58$

Fill in the blanks

- i. _____ is called multiplicative identity.
- ii. The product of 0 and any number is always _____.
- iii. Basics of division $8 \div 2 = 4$
8 is called _____, 2 is called _____ and 4 is called _____.
- iv. The divisor and quotient can be _____.

v. When any number is multiplied by 1, the product is the number _____.

vi. Multiplication and _____ are interrelated.

Divide these

i. $4567 \div 16$

ii. $97045 \div 65$

iii. $29904 \div 28$

iv. $25938 \div 25$

v. $19866 \div 11$

vi. $28995 \div 15$

Word Problems

- i. 952 sweets were distributed among 28 students. Each student got the same number of sweets. How many sweets did each student get?

- ii. A shop keeper bought 2175 ice-bags. If 5 ice-bags were packed in each box, how many boxes did he used?

- iii. Ayesha baked 2745 biscuits and divided them equally into 15 packs. How many biscuits did she put in each pack?

- iv. Akram bought 15 registers for Rs 480. What is the unit price of the register?

- v. A hawker sold 882 copies of a magazine in three weeks. How many copies did he sell each day?

A: Give the next three numbers for each series.

- i.  998, 999, 1000, **1001**, **1002**, **1003**

$$999 - 998 = 1 \quad \text{Difference is 1}$$

- ii.  7450, 7500, 7550, **7600**, **7650**, **7700**

$$7500 - 7450 = 50 \quad \text{Difference is 50}$$

- iii. 560, 570, 580, _____, _____, _____

- iv. 289, 299, 309, _____, _____, _____

- v. 2,350 , 2,450 , 2,550 , _____ , _____ , _____
- vi. 310, 410, 510, _____ , _____ , _____
- vii. 8068, 8069, 8070, _____ , _____ , _____
- viii. 5701, 5711, 5721, _____ , _____ , _____

B: Write the next three terms of each of the following patterns.

First term	Term-to-term rule	Next three Terms
5	Add 5	
12	Add 6	
50	Subtract 3	
8	Multiply by 2 and subtract 3	
100	Divide by 2 and add 4	

Assignment

A: Solve:

- i. $324,264 + 7,538$ iv. $9,876 + 198,745$
- ii. $123,124 + 4,324$ v. $98,746 + 3,836$
- iii. $4,529 + 78,965$ vi. $7,645 + 35,751$

B: Subtract:

- i. 5,482 from 87,364 iii. 7,255 from 410,342
- ii. 35,001 from 64,564 iv. 548,763 from 603,529





Four possible options are given for each of the following questions. Tick the correct one.

- 1 The period after thousand period is ____ period.
(a) Units (b) Tens (c) Hundreds (d) Millions
- 2 In the international place value system, we start grouping in number form right in the group of
(a) 2 (b) 3 (c) 4 (d) 5
- 3 When we write the number as a sum of place values of its digits it is called its ____ form
(a) Words (b) Place value (c) Numeral (d) Expanded
- 4 Four hundred fifty thousand, thirteen is written in numerals as:
(a) 450,013 (b) 450,130 (c) 405,013 (d) 405,130
- 5 Usman has a car of price Rs.2,865,750. He can find the price of 45 such cars easily by the operation of:
(a) Addition (b) Subtraction (c) Multiplication (d) Division
- 6 The sum of two numbers is 180. If one of them is 95, the other number is :
(a) 75 (b) 85 (c) 95 (d) 275
- 7 The answer to a multiplication question is called :
(a) Multiplier (b) Quotient (c) Multiplicand (d) Product
- 8 Multiply 384 by 100, the product is:
(a) 384 (b) 3840 (c) 38400 (d) 384000
- 9 Divide 4,950,000 by 1,000, we get:
(a) 495 (b) 4,950 (c) 49,500 (d) 495,000
- 10 If the sum of six equal numbers is 210, each number is :
(a) 25 (b) 35 (c) 45 (d) 204

A: Fill in the blanks.

- i. One million = _____ thousand.
- ii. Numbers of zeros in one million is _____.
- iii. The largest 6-digit number is _____.
- iv. The smallest 6-digit number is _____.

B: Write the following numbers in numerals.

- i. Four hundred thousand four hundred and twenty. _____
- ii. Eighty five thousand five hundred and twenty. _____
- iii. Seven hundred thousand seven hundred and seven. _____

C: Identify the pattern rule and complete the missing items in the following number patterns.

- i. 94, 85, 76, _____, _____, 49, 40, _____
- ii. 38, 45, _____, 59, 66, _____, 80.
- iii. 18, _____, 36, _____, 54, 63, _____, _____, 90
- iv. _____, 963, 321, _____

D: Identify the pattern rule and extend for the next three terms.

- | | |
|---------------------------------------|--------------------------------------|
| i. 110, 99, 88, 77, 66, 55
_____ | ii. 896, 448, 224, 112, 56
_____ |
| iii. 955, 910, 865, 820, 775
_____ | iv. 980, 865, 750, 635, 520
_____ |
| v. 326, 313, 300, 287, 274
_____ | vi. 790, 740, 690, 640, 590
_____ |

Unit 3

Fractions

Students Learning Outcomes

- Add and subtract two or three fractions with different denominators.
- Multiply a fraction by a 1-digit number and demonstrate with the help of diagram.
- Multiply two or three fractions involving proper, improper fractions and mixed numbers.
- Solve real life situations involving multiplication of fractions.
- Divide a fraction by another fraction involving proper, improper fraction and mixed numbers.
- Solve real life situations involving division of fractions.



Unit 3

Fractions



Addition and Subtraction of Unlike Fractions and Mixed Numbers

The fractions with different denominators are called unlike fractions. To add or subtract unlike fractions we first express them as like fractions.

Example:

$$\frac{5}{6} + \frac{3}{4}$$

$$\frac{5}{6} = \frac{10}{12}$$

$$\frac{3}{4} = \frac{9}{12}$$

2	6, 4
2	3, 2
3	3, 1
	1, 1
$2 \times 2 \times 3 = 12$	



$$\text{So, } \frac{10}{12} + \frac{9}{12} = \frac{19}{12} = 1\frac{7}{12}$$

A: Add these unlike fractions and simplify the answers.

i. $\frac{2}{7} + \frac{4}{14}$

ii. $\frac{12}{20} + \frac{4}{5}$

iii. $\frac{12}{20} + \frac{4}{5}$

iv. $\frac{2}{5} + \frac{10}{15}$

Rough Work



v. $\frac{2}{3} + \frac{6}{18} + \frac{1}{9}$

vi. $\frac{5}{18} + \frac{2}{3} + \frac{1}{6}$

vii. $\frac{7}{30} + \frac{2}{6} + \frac{1}{3}$

viii. $\frac{2}{4} + \frac{7}{16} + \frac{9}{24}$

Rough Work



ix. $\frac{2}{4} + \frac{7}{16} + \frac{9}{24}$

x. $\frac{13}{27} + \frac{19}{9} + \frac{3}{18}$

Rough Work

xi. $\frac{7}{8} + \frac{3}{4} + \frac{7}{12}$

xii. $\frac{4}{6} + \frac{2}{3} + \frac{3}{5}$



Addition and Subtraction of Mixed Numbers:

For addition or subtraction of mixed numbers, first we add or subtract the fractions and then the whole numbers.

Example:

$$3\frac{1}{4} + 2\frac{5}{6} + 1\frac{1}{8}$$

First, we add the fractions.

L.C.M of 4, 6 and 8 is 24

$$\begin{aligned} \frac{1}{4} + \frac{5}{6} + \frac{1}{8} &= \frac{6}{24} + \frac{20}{24} + \frac{3}{24} = \frac{6+20+3}{24} = \frac{29}{24} \\ &= 1\frac{5}{24} \end{aligned}$$

Now, $3 + 2 + 1 = 6$

$$\begin{aligned} 3\frac{1}{4} + 2\frac{5}{6} + 1\frac{1}{8} &= 6 + 1\frac{5}{24} \\ &= 7\frac{5}{24} \end{aligned}$$

**Example:**

$$3\frac{1}{9} - 1\frac{2}{3} \quad \text{L.C.M of 9 and 3 is 9}$$

$$\text{So, } 3\frac{1}{9} - 1\frac{2}{3} = 3\frac{1}{9} - 1\frac{6}{9}$$

We cannot subtract $\frac{6}{9}$ from $\frac{1}{9}$ so we regroup $3\frac{1}{9}$

$$\begin{aligned} 3\frac{1}{9} &= 2 + 1\frac{1}{9} \\ &= 2 + \frac{10}{9} \end{aligned}$$

$$\begin{aligned} \text{So, } 3\frac{1}{9} - 1\frac{2}{3} &= 2\frac{10}{9} - 1\frac{6}{9} \\ &= (2 - 1) \left(\frac{10}{9} - \frac{6}{9} \right) \\ &= 1\frac{4}{9} \end{aligned}$$

B: Add these mixed numbers and answer in lowest terms.

i. $1\frac{4}{9} + 1\frac{1}{5}$

ii. $4\frac{1}{8} + 1\frac{1}{3}$

iii. $2\frac{2}{3} + 1\frac{2}{5}$

iv. $5\frac{1}{6} + 1\frac{1}{12}$

Rough Work



v. $2\frac{1}{3} + 1\frac{1}{8} + 1\frac{1}{4}$

vi. $3\frac{1}{3} + 1\frac{1}{9} + 2\frac{1}{6}$

vii. $9\frac{1}{7} + 1\frac{1}{3} + 1\frac{1}{21}$

viii. $3\frac{1}{8} + 1\frac{1}{4} + \frac{1}{2}$

Rough Work



C: Subtract these fractions and express the answer in the simplest form.

i. $\frac{2}{3} - \frac{1}{7}$

ii. $\frac{7}{8} - \frac{5}{6}$

iii. $\frac{1}{5} - \frac{3}{25}$

iv. $\frac{8}{15} - \frac{2}{5}$

Rough Work



v. $3\frac{1}{7} - \frac{5}{8}$

vi. $2\frac{1}{3} - \frac{5}{11}$

vii. $7\frac{4}{5} - 1\frac{5}{6}$

viii. $5\frac{4}{9} - 3\frac{7}{8}$

Rough Work



Solve these

i. $\frac{2}{7} - \frac{3}{14} + \frac{1}{21}$

ii. $\frac{2}{3} - \frac{1}{6} + \frac{1}{12}$

iii. $\frac{5}{8} - \frac{1}{3} + \frac{1}{6}$

vi. $\frac{4}{6} + \frac{1}{2} - \frac{3}{8}$

Rough Work



v. $1\frac{3}{4} + 1\frac{5}{12} - 1\frac{1}{3}$

vii. $1\frac{3}{4} + 1\frac{1}{8} - 1\frac{1}{16}$

vi. $1\frac{3}{8} + 1\frac{1}{4} - 2\frac{1}{2}$

viii. $3\frac{1}{6} - 1\frac{1}{2} + 1\frac{1}{9}$

Rough Work



Word Problems

- ®

- for $5\frac{1}{2}$ hours in the morning and $4\frac{2}{5}$ hours in the afternoon.
Does he work in the morning than the afternoon?

Public
E-Sample

3. I spend $\frac{1}{6}$ of my salary on rent, $\frac{2}{3}$ on food and $\frac{1}{9}$ on clothing. What fraction of my salary do I save every month?

4. $\frac{5}{6}$ of the children ate their lunch at school. What fraction of the children did not eat at the school?

Public Sample

5. To bake a cake, I used $1\frac{3}{4}$ cup of milk and $\frac{2}{3}$ cup of water. How much liquid did i use altogether?

6. Sami ate $\frac{1}{5}$ of a bun. His sister ate $\frac{1}{3}$ of the bun. What part of the bun did they leave?

7. Ahmad is $151\frac{3}{4}$ cm tall while Amjad is $145\frac{3}{4}$ cm tall. How much taller is Ahmad than Amjad?

Multiplication of Fractions

Multiplication of a fraction by Whole Numbers:

When a fraction is multiplied by a whole number, we multiply the numerator of the fraction by the whole number.

Example:

$$\frac{1}{8} \times 5 = \frac{1 \times 5}{8} = \frac{5}{8} \quad \text{Check } \frac{1}{8} \times 5 = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$$

LCM is 8

$$\text{So, } \frac{1}{8} \times 5 = \frac{1+1+1+1+1}{8} = \frac{5}{8}$$



Multiplication of Fractions by Fractions:

Multiplication of a fraction by another fraction means fraction of a fraction. So to multiply one fraction by another, we multiply together their numerators and then their denominators.

Example:

$$\frac{5}{8} \times \frac{3}{8} = \frac{5 \times 3}{8 \times 8} = \frac{15}{32}$$

**Multiply:**

1. $3 \times \frac{1}{6}$

2. $\frac{2}{9} \times 18$

3. $\frac{2}{3} \times 4$

4. $5 \times \frac{2}{9}$

5. $\frac{4}{7} \times \frac{7}{12}$

6. $\frac{3}{5} \times \frac{2}{18}$

7. $\frac{5}{8} \times \frac{8}{10}$

8. $\frac{4}{5} \times \frac{3}{15}$

9. $\frac{14}{8} \times \frac{6}{7}$

10. $\frac{35}{14} \times \frac{13}{15}$

11. $1\frac{2}{3} \times 3$

12. $1\frac{3}{4} \times 2$

13. $2\frac{1}{2} \times 4$

14. $2\frac{1}{4} \times 5$

15. $3\frac{5}{8} \times 12$

16. $8\frac{4}{5} \times 10$

Division of a Fraction

We know that $9 \div 3 = 3$. We also know that division and multiplication are inverse of each other.

So 9 divided by 3 means 9 multiplied by multiplicative inverse of 3.

$$9 \times \frac{1}{3} = \frac{9 \times 1}{3} = \frac{9}{3} = 3$$

In the same way $\frac{1}{8} \div 3$ means $\frac{1}{3}$ of $\frac{1}{8}$

Or $\frac{1}{8} \times \frac{1}{3} = \frac{1 \times 1}{8 \times 3} = \frac{1}{24}$

Therefore to divide a fraction by a whole number, we multiply the fraction by "Multiplicative Inverse" of the number ($\frac{1}{3}$ is the "inverted form" of 3 and is known as the multiplicative inverse of 3.)

Divide:

1. $\frac{2}{3} \div 5$

2. $\frac{3}{4} \div 7$

3. $\frac{2}{5} \div 3$

4. $\frac{5}{8} \div 6$

5. $\frac{7}{10} \div 9$

6. $\frac{5}{12} \div 8$

7. $\frac{3}{4} \div 12$

8. $\frac{5}{7} \div 15$

9. $\frac{7}{8} \div 21$

10. $\frac{5}{9} \div 30$

11. $\frac{9}{10} \div 27$

12. $\frac{5}{12} \div 45$

Simplify the followings:

1. $\frac{3}{7} \div \frac{3}{7}$

2. $\frac{5}{17} \div \frac{15}{17}$

3. $\frac{24}{27} \div \frac{6}{9}$

4. $\frac{32}{25} \div \frac{8}{5}$

5. $\frac{5}{6} \div 1\frac{1}{9}$

6. $\frac{12}{13} \div 2\frac{8}{26}$

7. $\frac{11}{6} \div 6\frac{4}{3}$

8. $10\frac{1}{5} \div \frac{51}{20}$

9. $4\frac{2}{3} \div \frac{1}{9}$

10. $2\frac{4}{5} \div 2\frac{2}{3}$

Word Problems

1. A school has 960 students. $\frac{3}{4}$ of them are boys. How many girls are there in the school?

2. What is the value of 6 times $\frac{2}{3}$ of 81?

3. The weight of child is $\frac{1}{7}$ of the weight of his father. If his father weight is 63 kg. What is the weight of child?

4. A shopkeeper bought 144 eggs. He sold $\frac{3}{4}$ of them. How many eggs are still left to be sold?

5. Javed had Rs 4000. He gave $\frac{1}{40}$ of it to the "Zakat Fund". What amount is left with him?

6. A book is $\frac{1}{25}$ m thick. 30 such books are placed one on the top of the other. What is the height of the pile so formed?

7. Siama packed $8\frac{1}{2}$ kg of rice in 4 bags. How many kg of rice did each bag hold?

Unit 5

Distance & Time

Students Learning Outcomes

- Kilometres to metres and vice versa.
- Metres to centimetres and vice versa.
- Centimetres to millimetres and vice versa.
- Solve real life situations involving conversion, addition and subtraction of measures of distance
- Hours to minutes and vice versa.
- Minutes to seconds and vice versa
- Convert years to months and vice versa, months to days and vice versa, weeks to days and vice versa
- Add and subtract intervals of time in hours and minutes with carrying and borrowing.
- Solve real life situations involving conversion, addition and subtraction of intervals of time.



Unit 5

Distance & Time

Distance



The distance is the measurement of how far an object is from the other. The measurement of the distance between two places or objects shows the length of the path joining them. This path between two places or objects shows the distances between them. "The length of the space between two points is called distance."

Unit of Distance:

The unit of length is meter. It is denoted by **m**. The larger unit of length or distance is kilometer and it is denoted by **km**.

$$1\text{km} = 1000\text{m}$$

$$1\text{m} = 100\text{cm}$$

$$1\text{cm} = 10\text{mm}$$

Conversion of kilometers to meters and vice versa:

To convert larger units of length to smaller units, **we multiply**, because it takes many smaller units to make up a large unit.

- i. To convert kilometers into meters **multiply by 1000** or example to convert 5km into meter we work as

$$5\text{km} = 5 \times 1000\text{m}$$

$$5\text{km} = 5000\text{m}$$

To convert smaller units of length to larger units, **we divide**, because the number of larger units will be less than the number of smaller units.

- ii. To convert meters into kilometers **divide by 1000**. For example to convert 2000m into km, we work as

$$2000\text{m} = \frac{2000}{1000}\text{km}$$

$$2000\text{m} = \frac{2}{1} = 2\text{km}$$

- iii. To convert meters into centimeters, we multiply meters by **100**, because **1m = 100cm**. For example to convert 25m into cm.

$$25\text{m} = 25 \times 100\text{cm}$$

$$25\text{m} = 2500\text{cm}$$

- iv. To convert centimeters into meters, we divide centimeters by **100** because **100cm = 1m**. For example to convert 300 cm into m.

$$300\text{cm} = \frac{300}{100}\text{m}$$

$$300\text{cm} = \frac{3}{1} = 3\text{m}$$

Similarly, for conversion of centimeters to millimeters we multiply by **10** because **1cm = 10mm** and vice versa.

A: Convert the following as directed.

- i. 45 km to m

Solution:

$$45\text{ km} = 45 \times 1000\text{ m}$$

$$= 45,000\text{ m}$$

- ii. 62 km to m

- iii. 38 km to m

- iv. 97 km to m

v. 56 m to cm

vi. 13 m to cm

vii. 7300 cm to m

viii. 1890 cm to m

ix. 88 cm to mm

x. 5.3 cm to mm

xi. 74 km 930 m to m

xii. 6507 m to km and m

xiii. 250 m 46 cm to cm

xiv. 8.4 m to cm

Word Problems

- i. Alia purchased 5m 78cm long string and Sara purchased 9m and 93cm long string. What is the total length of both strings?

- ii. The ground floor of a house is 4m 75cm high and the first floor is 3m 98cm high. What is the height of this double-storey building?

- iii. Faiza purchased 14m 35cm of ribbon to make flowers. 7m 49cm of ribbon was used up. How much ribbon is left unused?

- iv. Pole A is 3m 76cm tall and Pole B is 2m 92cm tall. What is the difference of their height?

- v. The length of two ropes are 17cm 9mm and 80cm 6mm.

- (a) What is the difference between the length of two ropes?
- (b) What is the total length of two ropes in mm?

Time:

There are different units to measure the time. Units of time measure how long something lasts. The units of time are second, minute, hour, day, week, month and year. In the IS of units, the basic unit of time is second.

Conversion of Units of Time:

1 hour = 60 minutes 1 minute = 60 seconds

1 day = 24 hours 1 week = 7 days

1 month = 30 days 1 year = 12 months

i. To convert hours into minutes, multiply by 60.

ii. To convert minutes into hours, divide by 60.

$$1 \text{ hr} = 60 \text{ min} \quad , \quad 1 \text{ min} = \frac{1}{60} \text{ hr}$$

iii. To convert minutes into seconds, multiply by 60.

iv. To convert seconds into minutes, divide by 60.

$$1 \text{ min} = 60 \text{ sec} \quad , \quad 1 \text{ sec} = \frac{1}{60} \text{ min}$$

v. To convert weeks into days, multiply by 7.

vi. To convert days into weeks, divide by 7.

$$1 \text{ week} = 7 \text{ days} \quad , \quad 1 \text{ day} = \frac{1}{7} \text{ week}$$

vii. To convert months into days, multiply by 30.

viii. To convert days into months, divide by 30.

$$1 \text{ month} = 30 \text{ days} \quad , \quad 1 \text{ day} = \frac{1}{30} \text{ month}$$

ix. To convert years into months, multiply by 12.

x. To convert months into years, divide by 12.

$$1 \text{ year} = 12 \text{ months} \quad , \quad 1 \text{ month} = \frac{1}{12} \text{ year}$$

Convert the following units of time as directed.

i. 45 hr into min

ii. 6 hr 30 min into min

iii. 250 mn to hr and min

iv. 570 min to hr and min

v. 45 min to sec

vi. 30 min 40 sec to sec

vii. 1440 sec to min

viii. 740 sec into min and sec

ix. 8 years to months

x. 25 yrs 8 months to month

A: Find the sum of the following time durations.

i. 8 hr 30 min + 1 hr 34 min

ii. 20min43sec+32min 21sec

iii. 4 weeks 3 dyas + 2 weeks 1 day

iv. 5 months 11 days + 4 months 9 days

v. 6 hr 49 min + 2 hr 35 min

vi. 15 min 27 sec + 13 min 30 sec



B: Find the difference of the following time durations:

i. 8 hours 15 mins from 12 hours 10 min

ii. 6 hours 43 minutes from 10 hours 55 minutes

iii. 7 weeks 2 days from 9 weeks 5 days



iv. 11 months 3 days from 12 months 20 days

v. 23 years 7 months from 47 years 11 months

- vi. 32 min 43 seconds from 54 min 51 seconds

Word Problems

- a. The duration of a movie is 2 hr 45 min. It will start at 4:30 pm. When will it end?

- b. Mr. Asad joined a workshop which lasted for 3 weeks 4 days, then he joined IT training for 2 weeks 5 days. For how long, was he busy with these activities?

- c. Aslam left for Islamabad at 2:40 pm. It took 2 hours 55 minutes to arrive. At what time did he reach Islamabad?

- d. Noreen started to study at 4:30 pm and ended at 7:25 pm. What was the duration of her study?

- e. Bilal was 4 years 5 months old when he joined the school. Today he is 12 years 3 months old. For how long he has been in school?

**A: Fill in the blanks.**

- i. The unit of length is _____.
- ii. The unit of time is _____.
- iii. 1 m = _____ cm.
- iv. 2 days = _____ hours.
- v. 1 year = _____ weeks.
- vi. How many days are equal to 4 weeks? _____
- vii. How many minutes are there in 5 hours? _____
- viii. How many years are there in 72 months? _____
- ix. How many months in 5 years? _____
- x. To convert weeks into days, we _____ by 7.

B: Write the correct unit of measurement for the following.

- i. Length of room _____
- ii. School to home distance _____
- iii. Length of cloth _____
- iv. Length of book _____
- v. Length of garden bench _____



Unit 7

Geometry



Students Learning Outcomes

- Recognise straight and reflex angle.
- Recognise the standard units for measuring angles is 1° , which is defined as $1/360$ of a complete revolution.
- Identify, describe and estimate the size of angles and classify them as acute, right or obtuse.
- Compare angles with right angles and recognize that a straight line is equivalent to two right angles.
- Use protractor and ruler to construct:
 - A right angle
 - A straight angle
 - Reflex angles of different measures
- Describe adjacent, complementary and supplementary angles
- Identify and describe triangles with respect to their sides (isosceles, equilateral, and scalene).
- Identify and describe triangles with respect to their angles (Acute angled triangle, Obtuse angled triangle and right-angled triangles).
- Use protractor and ruler to construct a triangle when:
 - Two angles and their included side is given.
 - Two sides and included angle is given
 - Measure the lengths of the remaining two sides and one angle of the triangle.
- Recognise the kinds of quadrilateral (square, rectangle, parallelogram, rhombus, trapezium, and kite).
- Identify and describe properties of quadrilaterals including square, rectangle, parallelogram, rhombus, trapezium, and kite, and classify those using parallel sides, equal sides and equal angles.
- Use protractor and ruler to construct square and rectangle when lengths of sides are given.
- Recognise different types of symmetry (Reflective and Rotational) in 2D figures.
- Identify lines of symmetry for given 2D figures.
- Find point of rotation and order of rotational symmetry of given 2D figures
- Identify cubes, cuboids and pyramids from their nets.
- Describe and make 3D objects (cubes, cuboids, cylinder, cone, sphere, pyramids).

Chapter 7

Geometry

Concept of an angle

When two straight lines meet at a point an angle is formed.

" $\angle$ " is the symbol for an angle.

Vertex

The point where two lines meet is known as the vertex.

Types of angle

1. Acute angle:

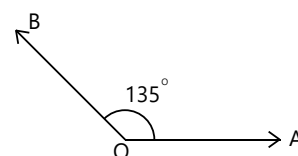
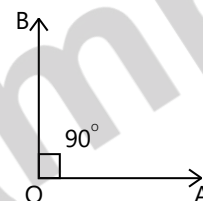
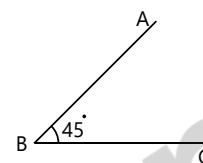
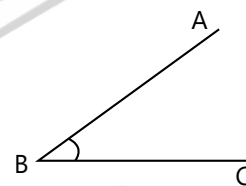
An angle which is less than 90° is called an acute angle.

2. Right angle:

An angle which is equal to 90° is called right angle.

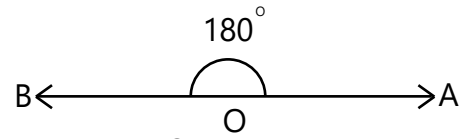
3. Obtuse angle:

An angle which is greater than 90° but less than 180° is called obtuse angle.

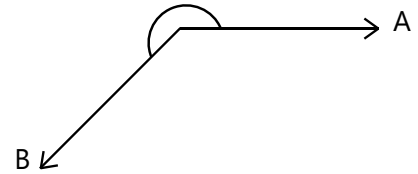


4. Straight angle:

An angle which is equal to 180° is called straight angle.

**5. Reflex angle:**

An angle which is greater than 180° but less than 360° is called reflex angle.

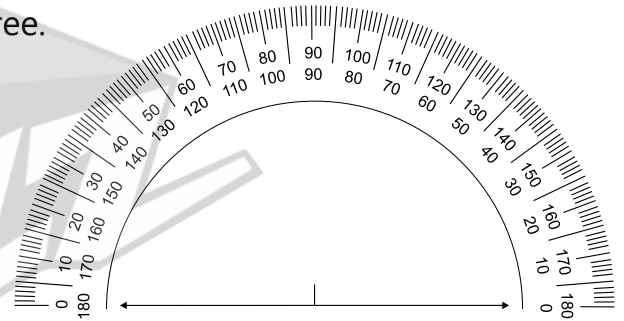
**Measuring Angles**

The unit for measuring the size of an angle is a degree.

1 complete rotation = 360 degree or 360°

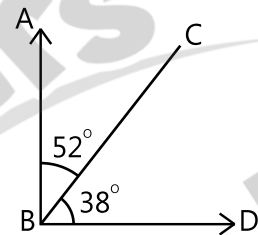
1 right angle = 90 degree or 90°

A protractor is used to measure an angle.

**Complementary and Supplementary Angles****Complementary Angles:**

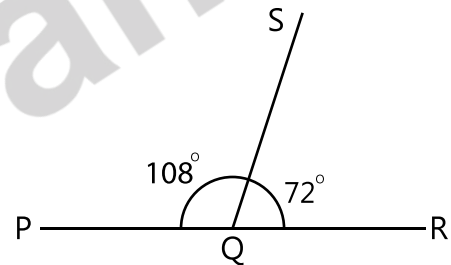
If the sum of two angles is 90° then the angles are called complementary angles.

$$\begin{aligned}\angle ABC + \angle CBD &= 52^\circ + 38^\circ \\ &= 90^\circ\end{aligned}$$

**Supplementary Angles:**

If the sum of two angles is 180° , then the angles are called supplementary angles.

$$\begin{aligned}\angle PQS + \angle RQS &= 108^\circ + 72^\circ \\ &= 180^\circ\end{aligned}$$

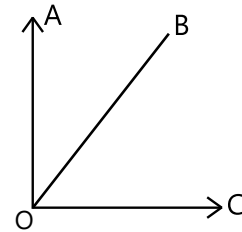


Adjacent angles:

Two angles which have a common arm and a common vertex are called adjacent angles.

$\angle AOB$ and $\angle COB$ have a common arm OB .

Therefore: $\angle AOB$ and $\angle COB$ are adjacent angles.

**Find the complement of the following angles.**

i. 12°

ii. 88°

iii. 45°

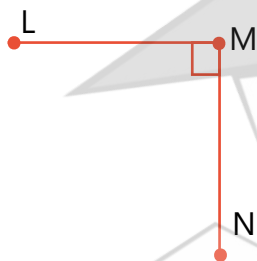
iv. 23°

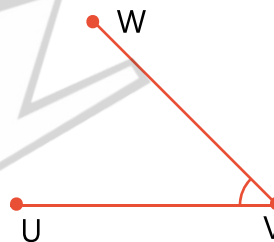
v. 60°

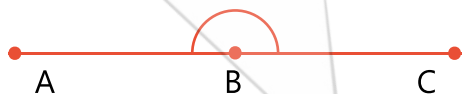
vi. 75°

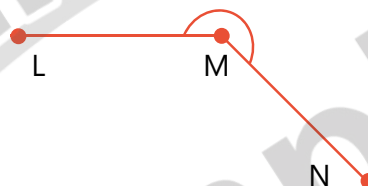
vii. 54° viii. 36°

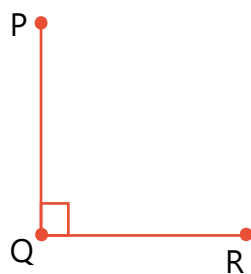
Identify and write the name, vertex and arms of the given following angles.

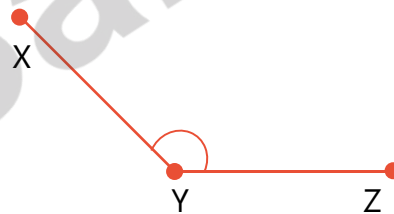


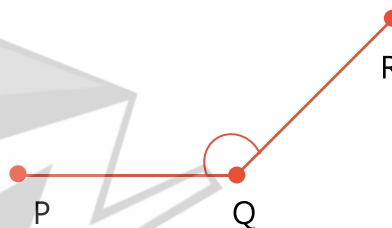
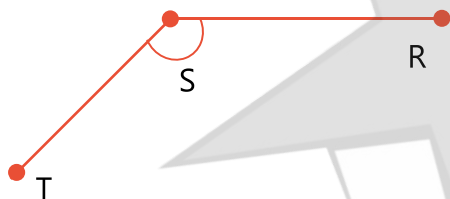
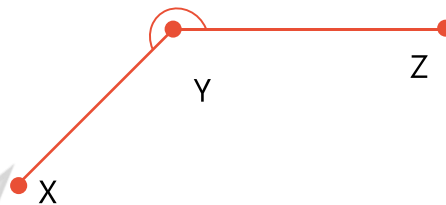
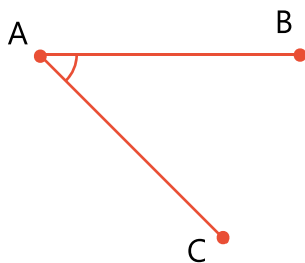






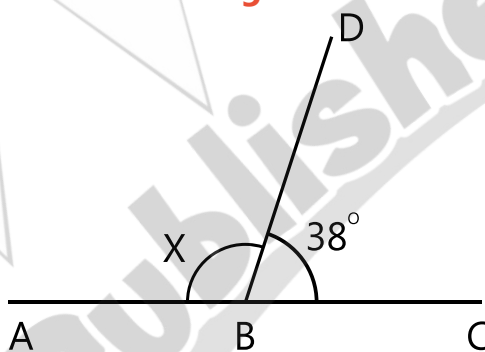


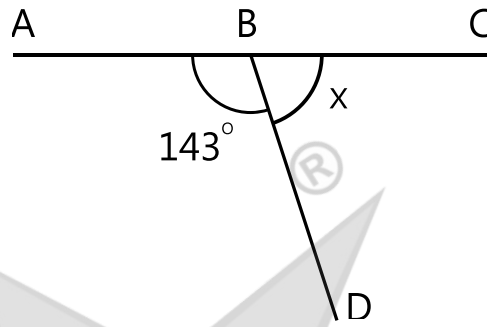
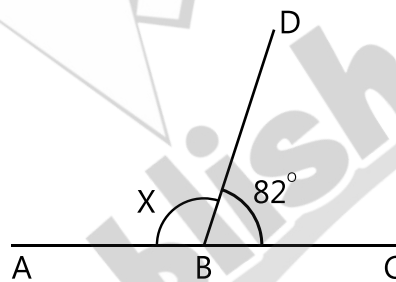


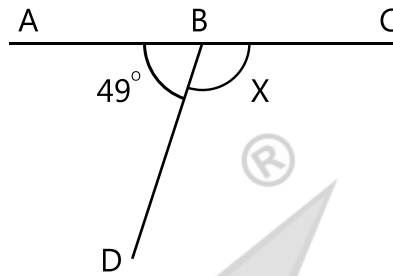


Find the value of x of each of the following.

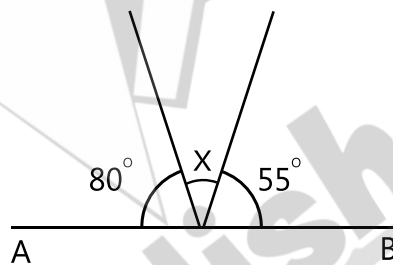
1. 38°



2. 143° 3. 82° 

4. 49° 

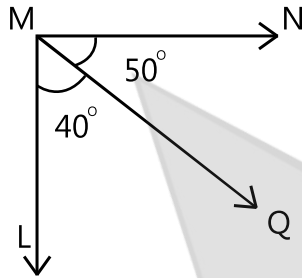
5.



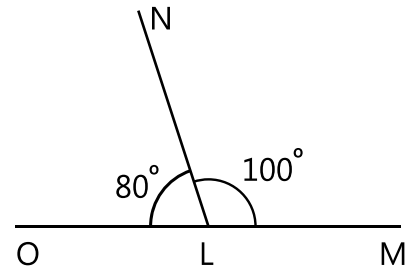
Activity

Identify the complementary and supplementary angles.

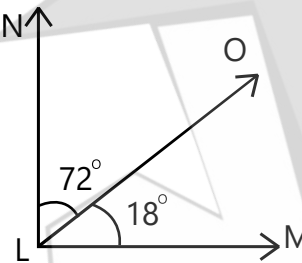
1.



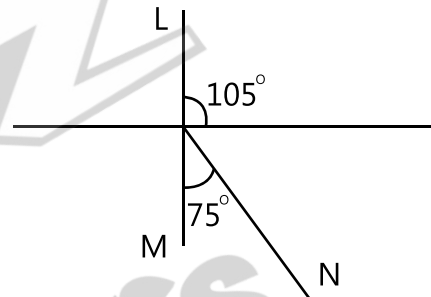
2.



3.



4.



Draw the angles with the help of protractors.

1. 35° 2. 90° 3. 145° 4. 180°

5. 230°

6. 270°

7. 60°

8. 110°

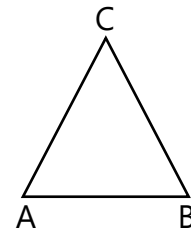
Publishers
E-Sample

Triangles

A triangle is a figure with three sides and three angles.

The sides are formed by straight lines.

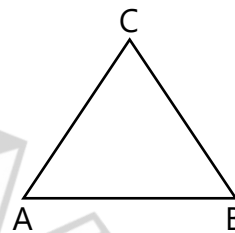
The points where the lines meet are called the vertices.



Types of Triangles

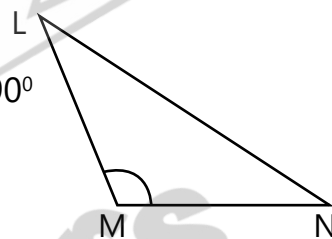
Acute angled Triangle:

A triangle in which all the angles are less than 90° is called an acute angled triangle.



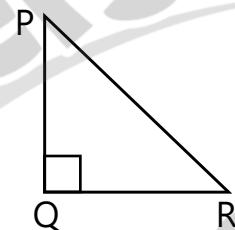
Obtuse Angled Triangle:

A triangle in which one of the angles is greater than 90° is called an obtuse angled triangle.



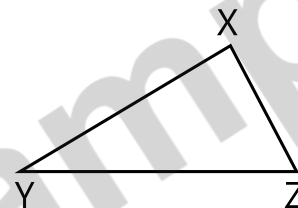
Right angled Triangle:

A triangle in which one of the angles is a right angle is called a right angled triangle.



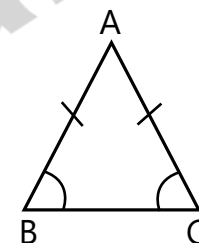
Scalene Triangle:

A triangle which has sides of different length and angles are also different is called a scalene triangle.



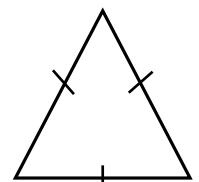
Isoceles Triangle:

A triangle in which two sides and angles on the base are equal is called an isosceles triangle.



Equilateral Triangle:

A triangle in which all three sides are equal is called an equilateral triangle.



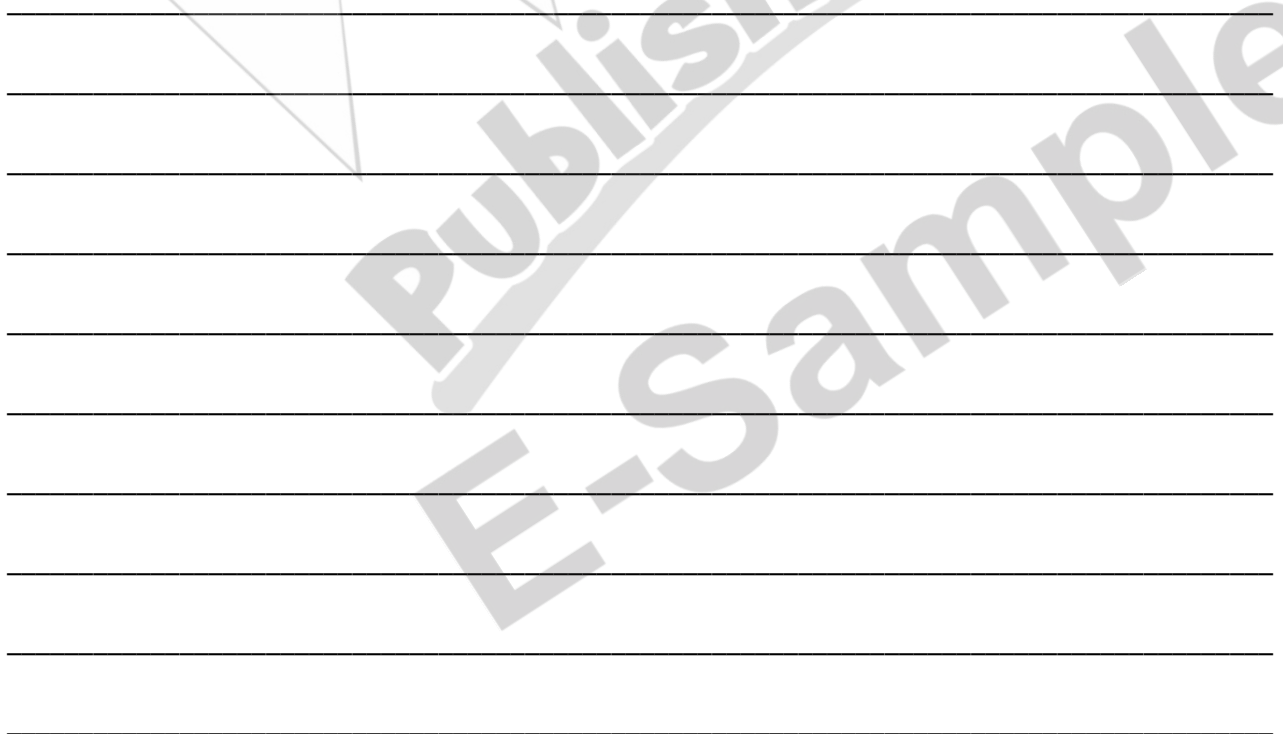
Angles of a Triangle:

The sum of the three angles of a triangles is always 180° or two right angles. The measure of third angle = $180^\circ - (\text{Sum of given angles})$

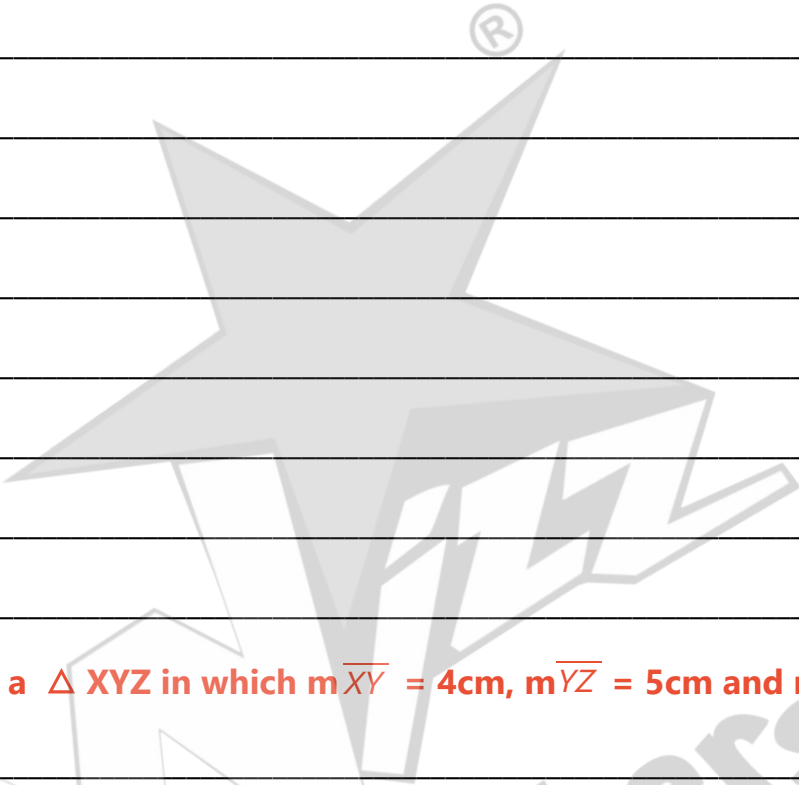
1. Construct a $\triangle ABC$ in which $m\overline{AB} = 5\text{cm}$, $m\angle A = 60^\circ$ and $m\angle B = 60^\circ$



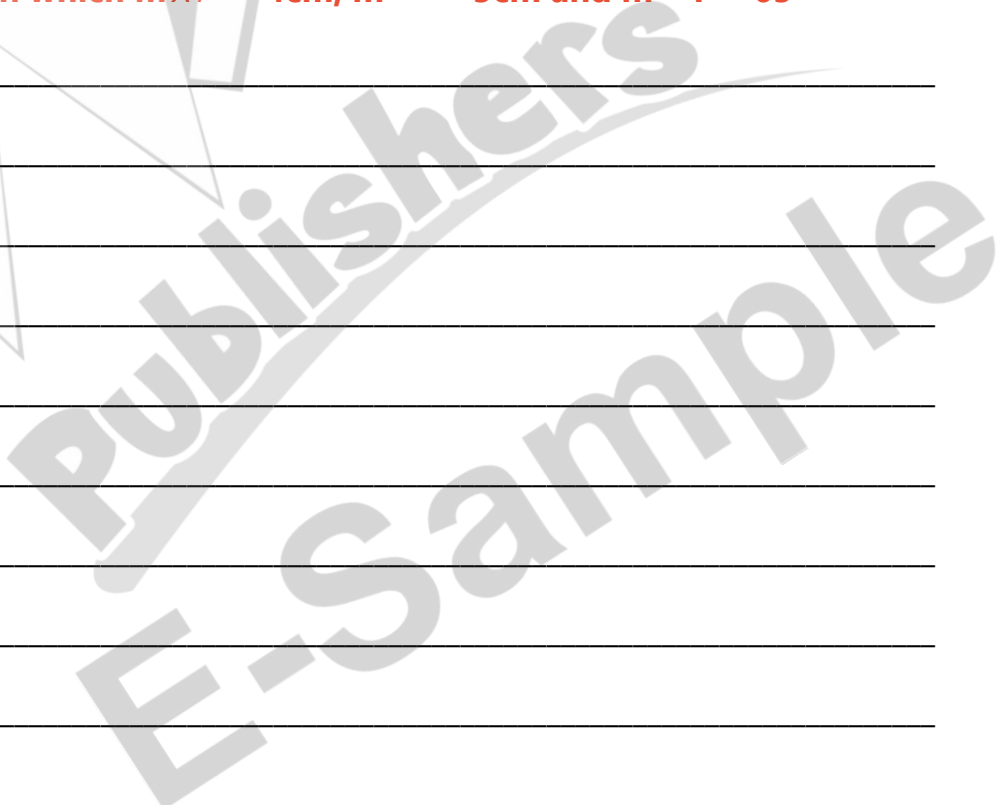
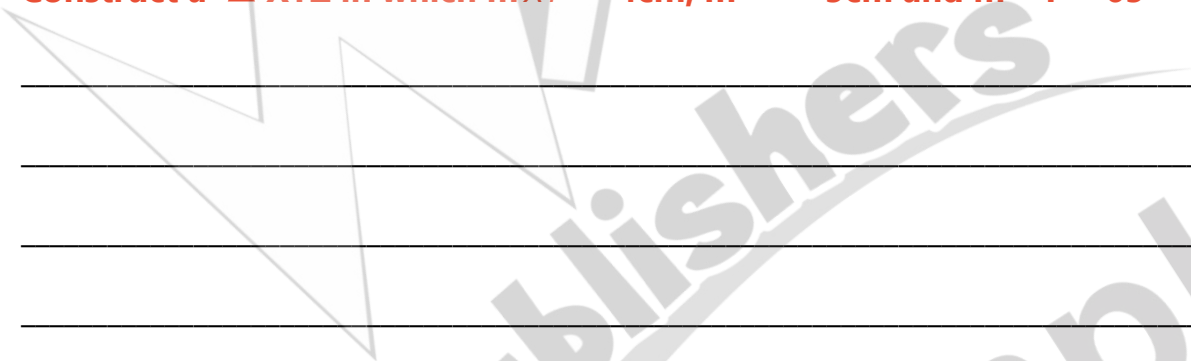
2. Construct a $\triangle LMN$ in which $m\overline{LM} = 4\text{cm}$, $m\angle L = 75^\circ$ and $m\angle M = 35^\circ$



3. Draw a triangle when $m\overline{PQ} = 4.5\text{cm}$, $m\angle P = 70^\circ$ and $m\angle Q = 50^\circ$



4. Construct a $\triangle XYZ$ in which $m\overline{XY} = 4\text{cm}$, $m\overline{YZ} = 5\text{cm}$ and $m\angle Y = 65^\circ$



5. Find the measure of the third angle of a triangle from the following.

i. $70^\circ, 40^\circ$

ii. $100^\circ, 35^\circ$

iii. $65^\circ, 85^\circ$

iv. $97^\circ, 23^\circ$

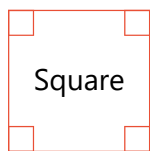
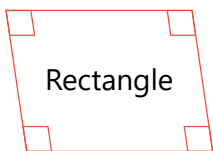
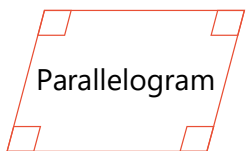
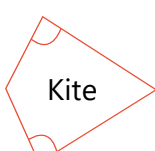
Quadrilateral and kinds of Quadrilateral:

A quadrilateral has four sides and four angles. Depending upon the size of sides and angles, quadrilateral has different kinds. For example, square, rectangle, parallelogram, rhombus, trapezium and kite all are quadrilaterals.

The sum of measures of angles of any quadrilateral is always equal to 360



Quadrilateral and their properties:

 Square	 Rectangle	 Parallelogram	 Rhombus	 Trapezium	 Kite
--	--	--	---	--	---

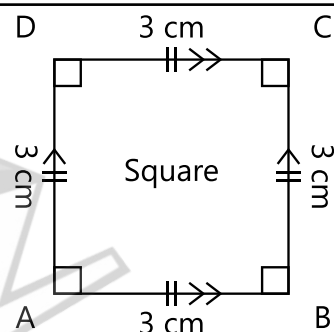
Square:

A quadrilateral having four equal sides and four right angle is a square.

In the figure, ABCD is a square.

$$m\overline{AB} = m\overline{BC} = m\overline{CA} = m\overline{DA} = 3\text{cm}$$

$$m\angle A = m\angle B = m\angle C = m\angle D = 90^\circ$$



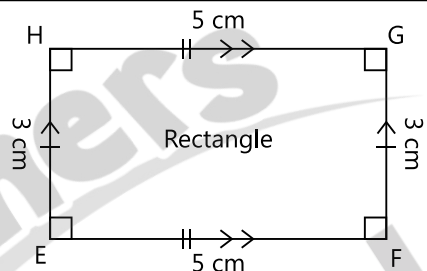
Rectangle:

A quadrilateral having opposite sides equal and four right angle is a rectangle.

In the figure, EFGH is a rectangle.

$$m\overline{EF} = m\overline{GH} = 5\text{cm and } m\overline{FG} = m\overline{EH} = 3\text{cm}$$

$$m\angle E = m\angle F = m\angle G = m\angle H = 90^\circ$$



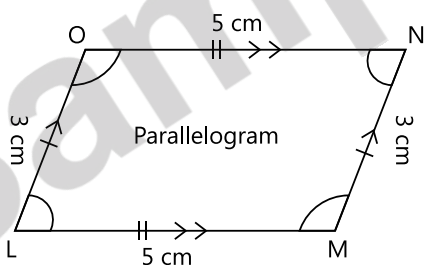
Parallelogram:

A parallelogram is a quadrilateral in which the opposites sides are parallel and equal.

In the figure, LMNO is a parallelogram.

$$m\overline{LM} = m\overline{NO} = 5\text{cm and } m\overline{MN} = m\overline{LO} = 3\text{cm}$$

$$\overline{LM} \parallel \overline{NO} \text{ and } \overline{MN} \parallel \overline{LO}$$



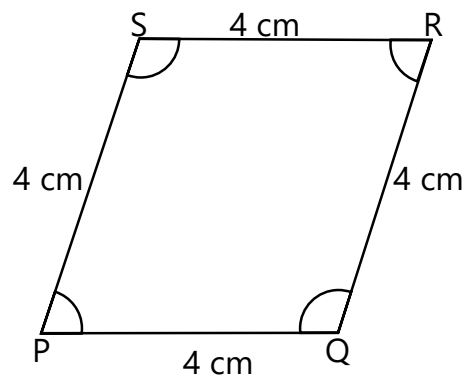
Rhombus:

A quadrilateral having four sides equal and opposite sides parallel is a rhombus, opposite angles are equal but not right angle.

In the figure, PQRS is a rhombus.

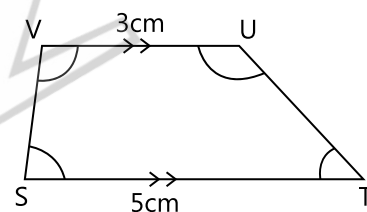
$$m\overline{PQ} = m\overline{QR} = m\overline{RS} = m\overline{SP} = 4\text{cm}$$

$$\overline{PQ} \parallel \overline{RS} \text{ and } \overline{QR} \parallel \overline{SP}$$

**Trapezium:**

A quadrilateral having one pair of opposite sides parallel is a trapezium.

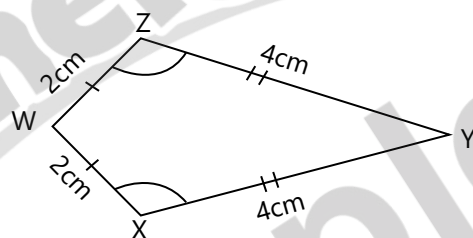
In the figure, STUV is a trapezium and $\overline{ST} \parallel \overline{UV}$

**Kite:**

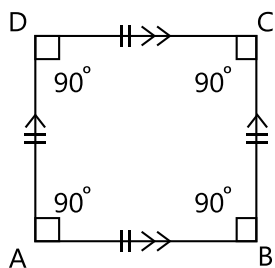
A quadrilateral having two pair of adjacent sides equal is a kite.

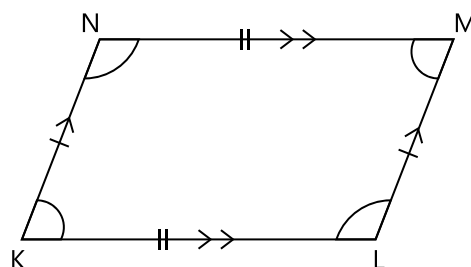
In the figure, WXYZ is a kite.

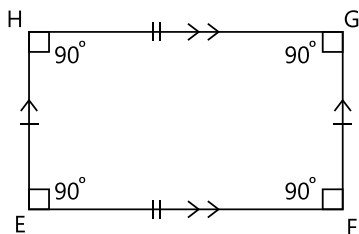
$$m\overline{WX} = m\overline{WZ} \text{ and } m\overline{XY} = m\overline{YZ}$$

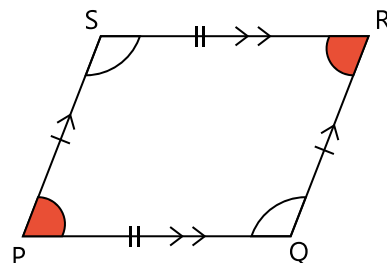


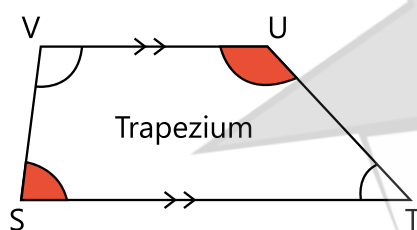
A: Identify the following quadrilateral and enlist at least two properties.

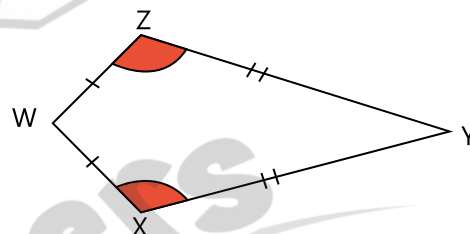












B: By using ruler and protractor draw square ABCD of the following measures.

i. Side = 3cm

ii. Side = 5cm

iii. Side = 4.5cm

iv. Side = 3.5cm

C: Draw rectangles LMNO by using ruler and protractor of the following measures:

i. Length=5cm, Breadth = 4cm

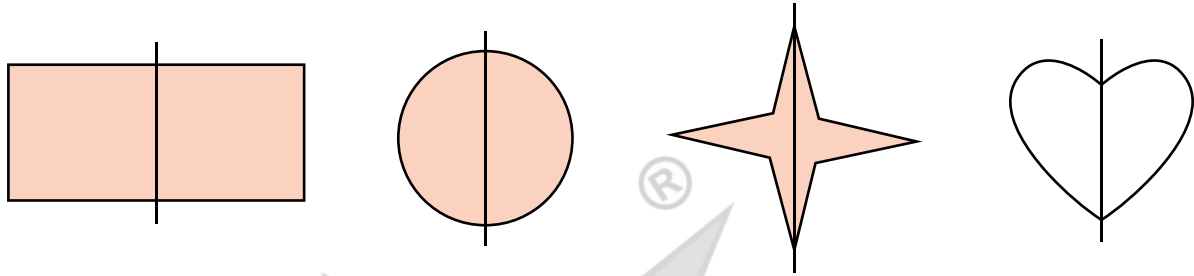
ii. Length= 6cm, Breadth= 3cm

iii. Length= 4.5cm,Breadth= 2.5cm

iv. Length= 6.5cm,Breadth=4.5cm

Symmetry:

A shape has symmetry if a central dividing line (a mirror line) can be drawn on it, to show that both sides of the shape are exactly the same. Observe the following figures.



A central dividing line separating the figures into two parts. Observe that both parts of each figure are same. Thus the above shapes are symmetric.

Types of Symmetry:

i. Reflective Symmetry

ii. Rotational Symmetry

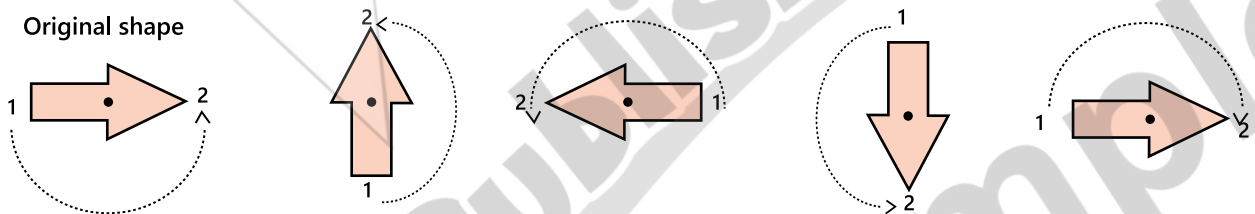
Reflective Symmetry:

The central line divides the shapes into two same parts. Both the parts are mirror images of each other. This is called reflective symmetry.

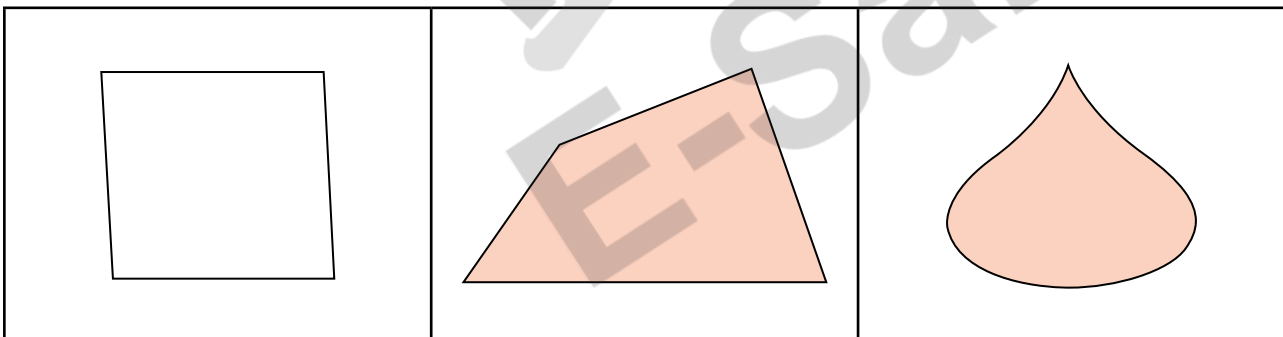
Rotational Symmetry:

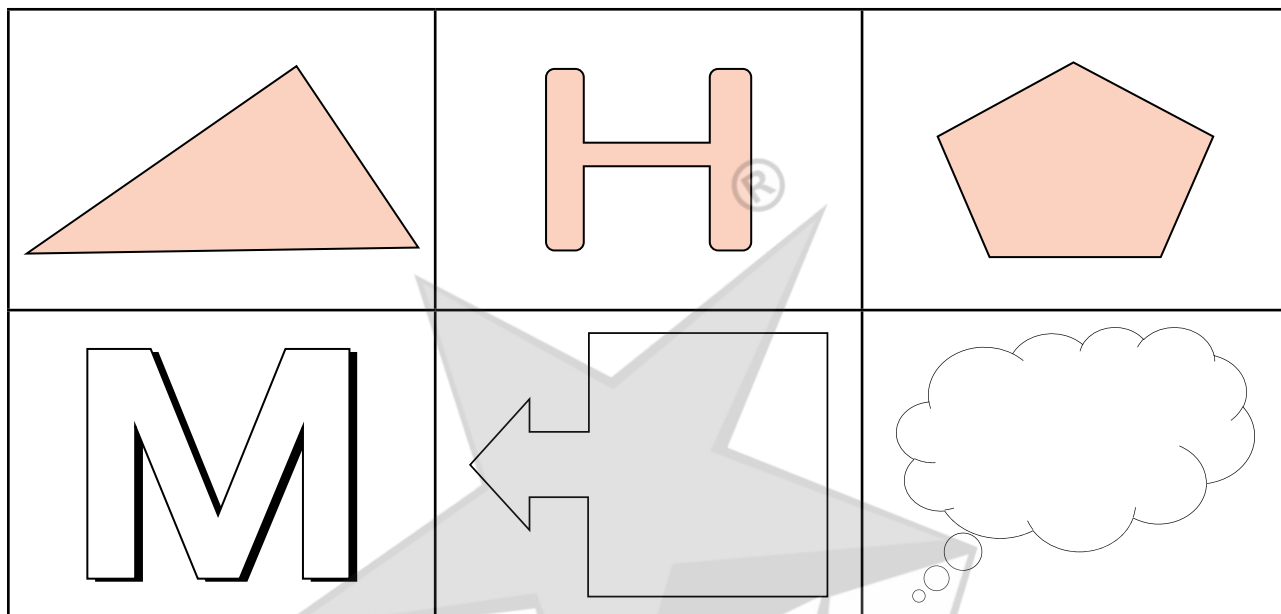
There are 360° in a complete rotation. It can be divided into 4 rotations of 90° each.

A figure has a rotational symmetry if it coincides with the original shape at least twice in a complete rotation.

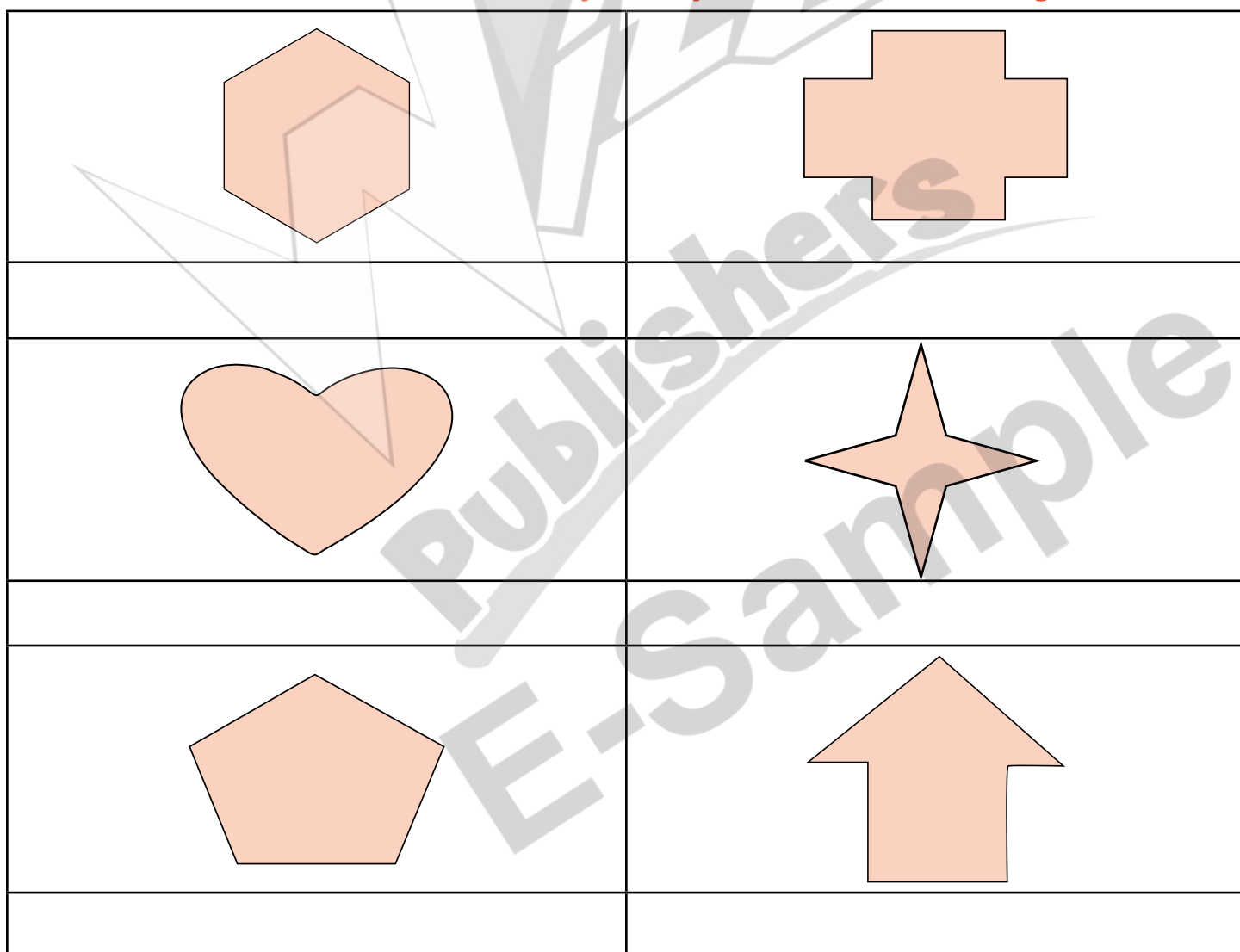


A: Tick the reflective symmetric figures. Also draw a line of symmetry.





B: Determine the order of rotational symmetry of each of the following.

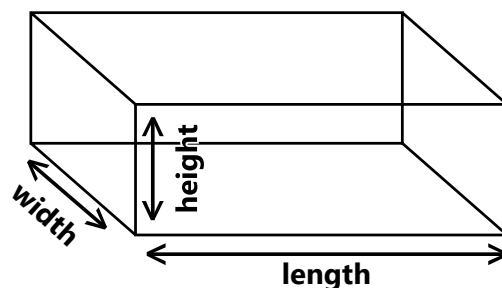


Three dimensional (3-D) Objects:

Three-dimensional objects are solid objects which can be measured in 3 directions. These objects have length, width, and height (thickness).

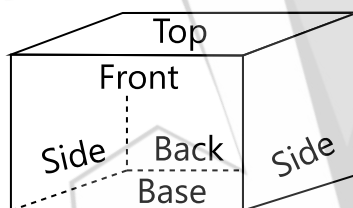
For example, cube, cuboid, cylinder, cone, sphere, pyramid, etc.

The net of a 3-D shape is what it looks like if it is opened out flat.

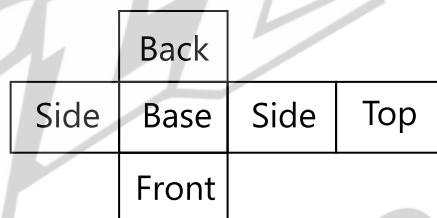


Net of a Cube

Look at the given diagrams. There is a cube on the left side and a net of a cube is on the right side. The net of the cube contains six squares that were six faces of a cube.



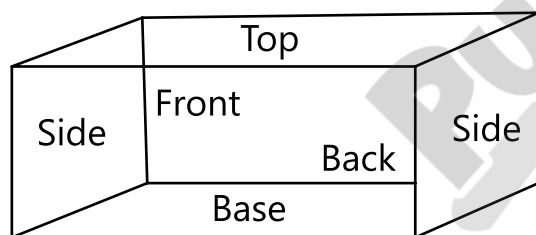
Cube



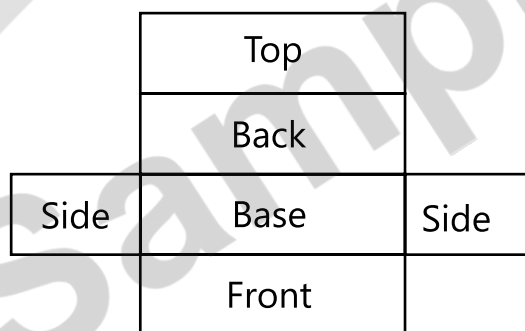
Net of Cube

Net of a Cuboid

Look at the given diagrams. There is a cuboid on the left side and a net of a cuboid is on the right side. The net of the cube contains six rectangles that were six faces of a cuboid. The sides of the cuboid may be square.



Cuboid

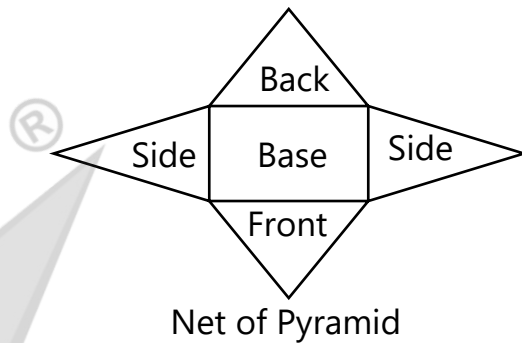
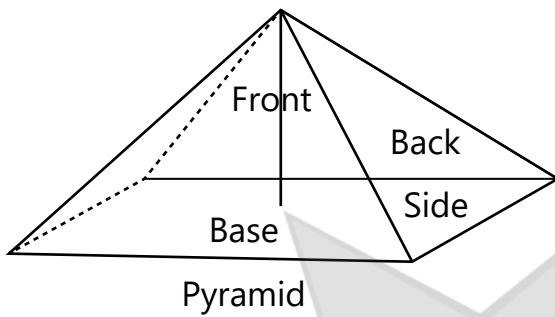


Net of Cuboid

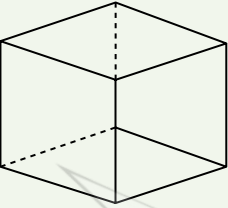
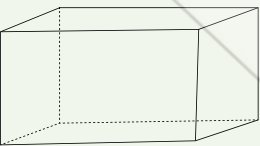
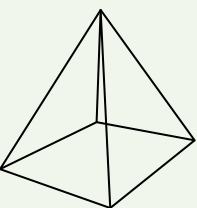
Net of a Pyramid

Look at the given diagrams. There is a square-based pyramid on the left side and its net is on the right side. The net of the square pyramid has four triangles and one square that

were its four faces and base respectively.

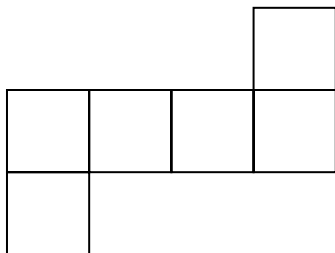


A Write the names of the given shapes. Also write down the number of faces and vertices.

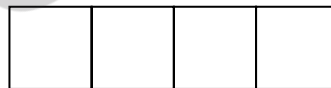
Shapes	Name	Number of faces	Number of vertices	Number of edges
				
				
				

B Identify the given nets as cube, cuboid and pyramid.

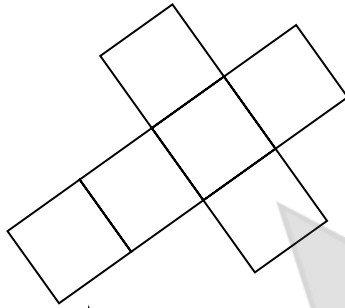
i



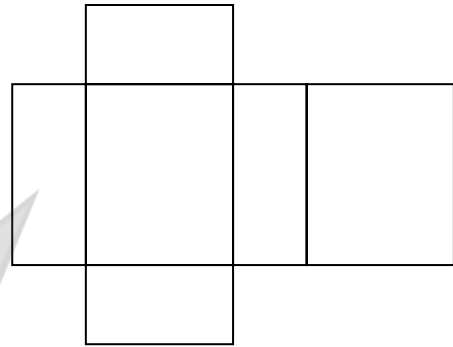
ii



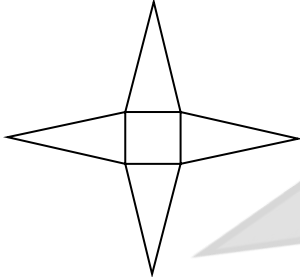
iii



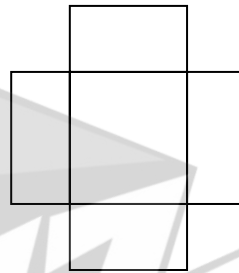
iv



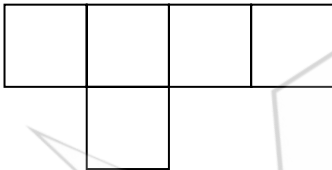
v



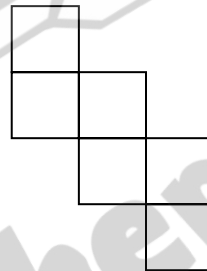
vi

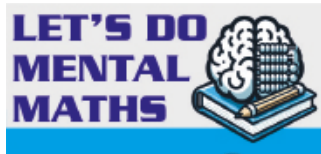


vii

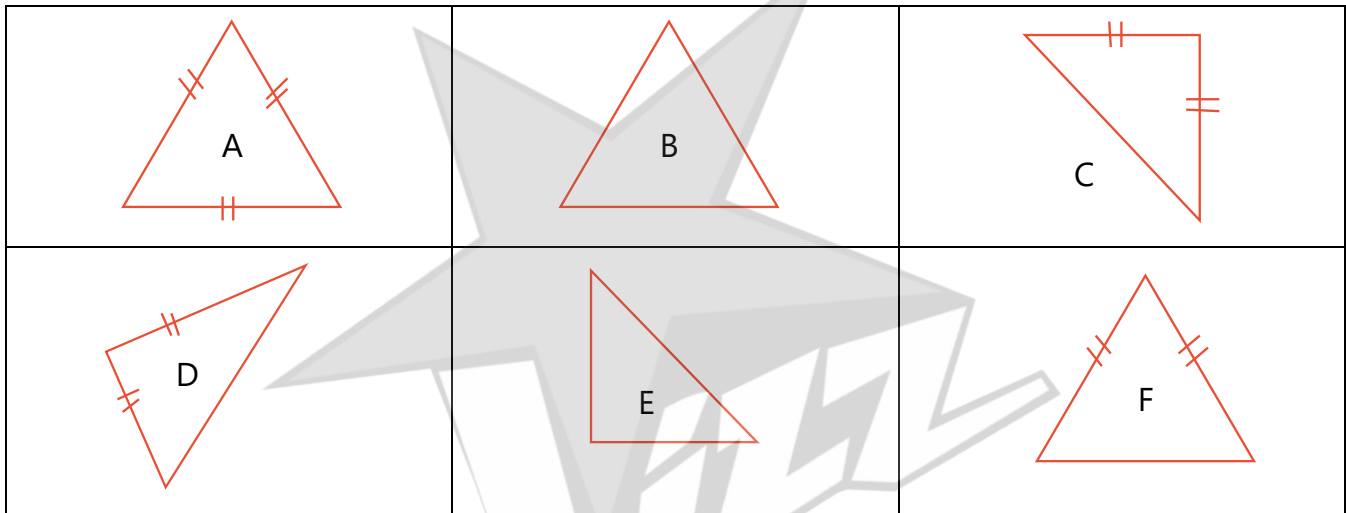


viii





Fill in the blanks



- Triangle _____ is an equilateral triangle.
- Triangles _____ and _____ are right angled triangles.
- Triangles _____, _____ and _____ are isosceles triangles.
- Triangle C has _____ equal sides.
- All the sides of triangle A are _____.

Assignment

A: Choose the correct answer.

i. _____ is an acute angle.			
34°	90°	103°	None of these
ii. _____ is an obtuse angle.			
34°	90°	103°	None of these
iii. _____ is a right angle.			
72°	55°	90°	180°

iv. Two angle with a common vertex and a common arm is called ____ anlges.

Supplementary

Adjacent

Complementary

None of these

v. Two angles are said to be _____ angles if the sum of both angles is equal to 90° .

Complementary

Supplementary

Adjacent

None of these

vi. Two angles are said to be _____ angles if the sum of both angle is equal to 180° .

Complementary

Supplementary

Adjacent

None of these

vii. A triangle having one angle equal to 90° is called _____ triangle.

Acute angled

Right angled

Obtuse angled

None of these

B: Fill in the blanks.

i. A quadrilateral is a _____ sided figure.

ii. The sum of all the angle of a rhombus is _____.

iii. A parallelogram with all four sides equal in length is called a _____.

iv. In a parallelogram, the opposite angles are _____.

v. In a _____ two adjacent sides are equal.

C. Fill in the blanks.

i. The common end point of an angle is called the _____.

ii. Sum of the angles in a quadrilateral is _____.

iii. Sum of the angles in a triangle is _____.

iv. The unit of measurement of an angle is _____.

v. A ray has a beginning point, but no _____ point.

vi. Obtuse angle has a measure greater than 90° but less than _____.

vii. Acute angle has a measure greater than _____ but less than 90° .

viii. The sum of two supplementary angles is _____.

- ix. In a right triangle measure of the largest angle is _____.
- x. If one of the angles of a triangle is 110° , then the triangle is called _____ angled triangle.
- xi. In a square and rectangle all the angles are _____.
- xii. In a parallelogram, opposite angles are _____.
- xiii. In a cube the breadth, length and _____ are equal.
- xiv. In a kite the two consecutive sides are _____.
- xv. In a pyramid, there are _____ faces.

D. Tick the correct answer:

1. A triangle has _____ sides.

- (a) 2 (b) 3 (c) 4 (d) 5

2. Which is a measure of reflex angle?

- (a) 180° (b) 165° (c) 210° (d) 360°

3. A quadrilateral has _____ sides.

- (a) 2 (b) 3 (c) 4 (d) 5

4. In a cube, there are _____ faces.

- (a) 4 (b) 6 (c) 8 (d) 12

5. In a pyramid, there are _____ edges.

- (a) 4 (b) 5 (c) 6 (d) 8

Unit 9

Data Handling

Students Learning Outcomes

- Find and describe average of given quantities in the data.
- Solve real life situations involving average.
- Organize the given data using bar graph.
- Read and interpret a bar graph given in horizontal and vertical form.
- Draw horizontal and vertical bar graphs for given data.
- Solve real life situations using data presented in bar graphs.



Unit 9

Data Handling

Find the Average

In order to find the average of given numbers or quantities, we add them and divide their sum by the number of quantities.

Generally,

$$\text{Average} = \frac{\text{Sum of quantities}}{\text{Number of quantities}}$$

Also, sum of quantities = average $\times$ number of quantities

Example:

$$30 + 50 + 25 + 30 \text{ and } 40$$

$$\begin{aligned} \text{Average} &= \frac{30 + 50 + 25 + 30 + 40}{5} \\ &= \frac{175}{5} \\ &= 35 \end{aligned}$$



Find the average of each of the following.

i. 5, 7 and 9

ii. 1, 8 and 3

iii. 43, 25 and 52

iv. 13, 20, 32 and 45

v. 20, 32, 41 and 15

vi. 4, 6, 9 and 10

vii. 66kg, 45kg and 51kg

viii. 2.4km, 1.9km and 6.2km

ix. Rs 430, Rs 320, Rs 420 , Rs 520 and Rs 680

x. 126.2 cm, 121.4 cm, 32.7 cm and 128.2 cm

Work Sheet 1

1. The table shows the scores obtained by 4 pupils for a Mathematics quiz. What is the average score of the 4 pupils.

Name	Score
Farhan	24
Anum	21
Sara	26
Sam	25



$$\text{Average Score} = \frac{\text{Total Score}}{\text{Number of pupils}}$$

2. The table shows the number of flights handled by an airport over 3 days in 2016.

Day	Monday	Tuesday	Wednesday
Number of flights	856	924	968

What was the average number of flights handled each day?

$$\text{Average no of flights} = \frac{\text{Total no of flights}}{\text{Number of days}}$$

Total number of flights in 3 days = _____

Average number of flights each day = _____ ÷ 3

= _____

3. The table shows the number of pupils in each level in a primary school. What is the average number of pupils in each level?

Level	Number of pupils
Primary 1	300
Primary 2	238
Primary 3	195
Primary 4	202
Primary 5	246
Primary 6	181

Total number of pupils = _____ + _____ + _____ + _____ + _____ + _____

= _____

Average number of pupils in each level = _____ ÷ _____

= _____

4. 3 children have an average of 43 stickers each. How many stickers do the children have altogether?

Total number of stickers = Average number of sticker

×

Number of children

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

The children have stickers altogether.

Note:

When two quantities are given, we can find the third quantity.

5. A lift can carry 12 people with an average mass of 70 kg. What is the greatest load the lift can carry?

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

The greatest mass the lift can carry is kg.

Word Problems

1. Find the average of 26, 35, 29, 16 and 24.

2. The average height of four girls is 102 cm. What is their total height?

3. The average number of passengers in a carriage of a train is 8. If the train has 10 carriages, what is the total number of passengers in the train?

4. The average weight of three girls is 30.5 kg and the average weight of two boys is 31.5 kg. What is the total weight of the boys and girls?

5. Ahmad spends an average of Rs 35 every day. How much money does he spend in 5 days?

6. The average number of oranges in a crate is 46. What is the total number of oranges in 5 crates?

7. The marks obtained by the students of class 5 in a mathematics test are 35, 39, 45, 38, 50 and 16. Find the average of marks?

8. The height of six runners are 160cm, 137cm, 153cm, 155cm, 149cm and 152cm. Find the average height of each runner?

Define Graph:

In math, a graph can be defined as a pictorial representation or a diagram that represents data or values in an organized manner. The points on the graph often represent the relationship between number and quantities.

Kinds of Graph:

There are several kinds of graph. Some of them are.

1. Pictograph
2. Column graph or Bar graph.
3. Combined bar graph
4. Line graph
5. Circle graph or Pie graph

Data:

A collection of facts and statistics gathered or available for analysis and calculation about a specific topic is called **data**.

Organising data means arranging the data to make it meaningful, easy to understand, and more useful. It is helpful in presenting, analysing and drawing conclusions about data in numerical forms. For organizing the data we can use bar graph.

Bar Graphs:

In bar graph, bars of equal width but of different heights are used to represent data. With the help of table of information we can draw a graph.

There are two types of bar graph:

- i. Horizontal bar graph
- ii. Vertical bar graph

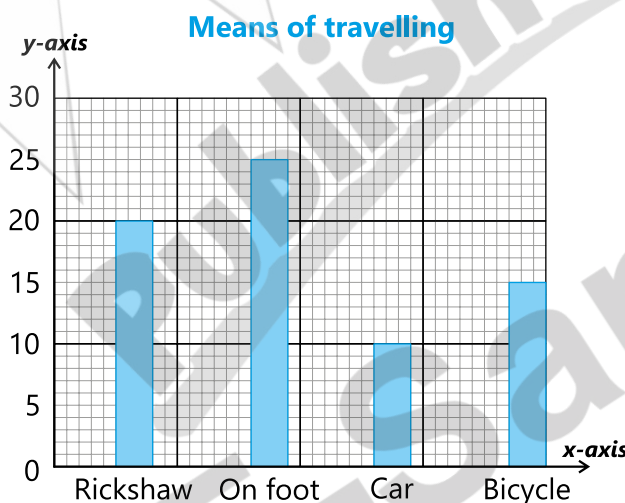
i. Vertical bar graph:

In vertical bar graph, data is represented by bars along y-axis.

Following is the information about the means of travelling of class V children.

Means of travelling	Bicycle	On foot	Car	Rickshaw
No. of children	20	25	10	15

The above table shows the number of children using the means of travelling to go to school. Read the graph carefully and interpret the information. On the bases of information given in the above table, the following vertical bar graph has been drawn:



On the x-axis, the means of travelling have been marked. On the y-axis, the number of children have been marked, by taking each small square equal to 1 child.

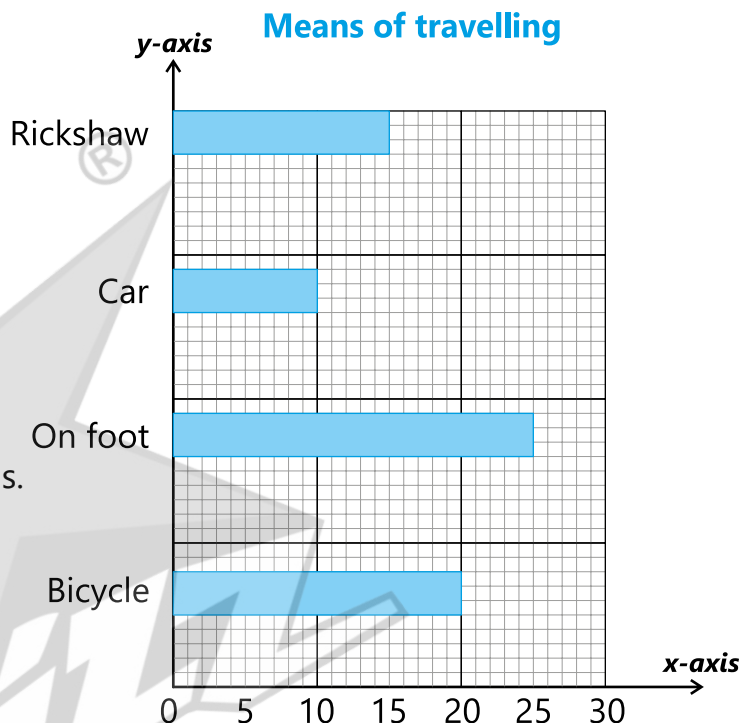
From the above graph, we can see, 20 children use bicycle, 25 children come to school on foot, 10 children have car and 15 children hire rickshaw.

i. Horizontal bar graph:

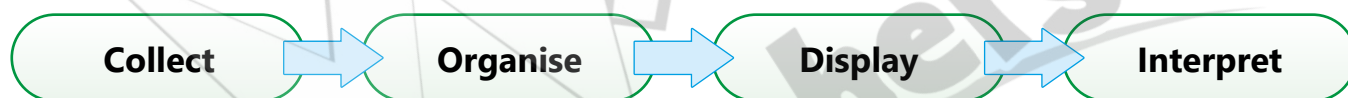
The same information given in the above table can be represented by a horizontal bar graph, in which the information have been rotated from x-axis to y-axis.

In horizontal bar graph, information of children is represented by bars along x-axis.

The information of means of travelling is represented by bars along y-axis.



We can summarise data handling as follows:



Tabular form of data is a list of facts or figures arranged in an ordered way, especially in columns. These bars are made along x-axis and y-axis in the graph.

Good to know:



- i. Collected information is called data.
- ii. A graph is a diagram which represents data.
- iii. A bar graph is a diagram made up of bars.
- iv. Each bar represents part of the data.
- v. Bar graph is of two types. Horizontal bar graph and vertical bar graph.

Diagram of Vertical Bar Graph:

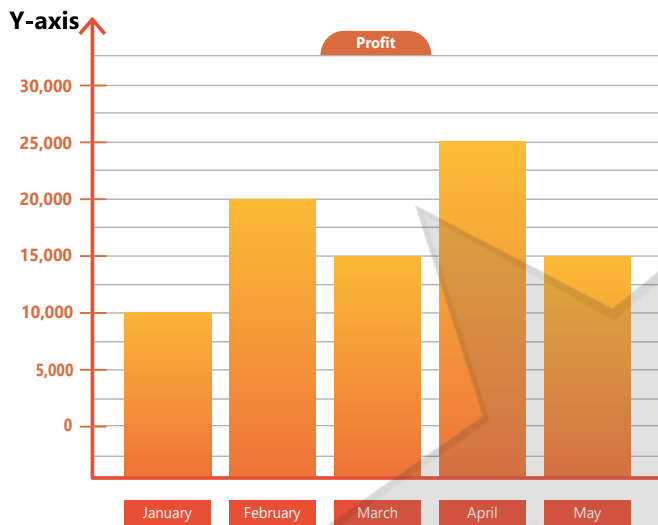
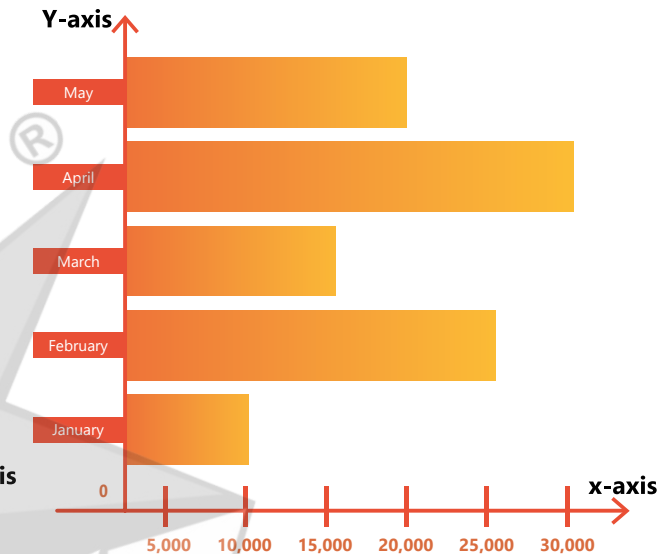


Diagram of Horizontal Bar Graph:



EXERCISE

1. The following table shows the number of runs scored by five players in a match.



Players	1	2	3	4
Runs	30	25	40	35

Draw a vertical and horizontal bar graph of the given data.

2. Following is the given information about the means of travelling of class V pupils.

Means of travelling	Bicycle	Onfoot	Car	Van
Number of pupils	20	25	10	15

Represent the above information through a vertical and horizontal bar graph.

3. The marks obtained by Haris in 5 subjects out of 50 are given below.

Subjects	Math	Science	Urdu	English	S.st
Obtained marks	48	45	38	40	32

Draw a horizontal and vertical bar graph to represent the above data.

4. In a survey, kids were asked about their favourite ice-cream flavours. The following bar graph shows the result of the survey. Read the graph and answer the following questions.

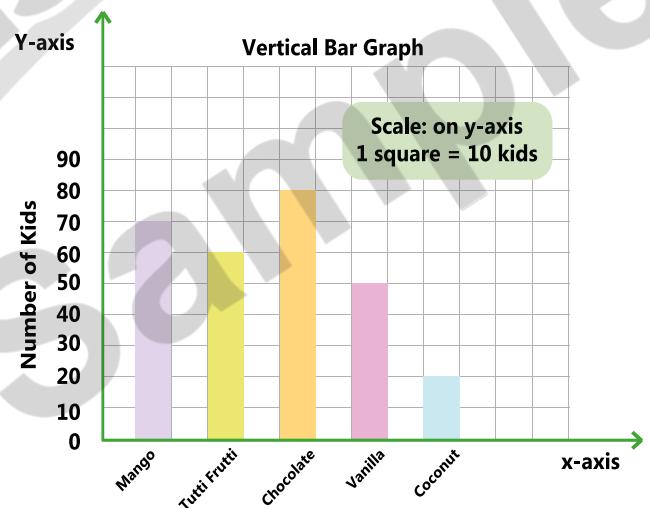
i. How many kids did like mango flavour?

ii. How many kids did like tutti-frutti?

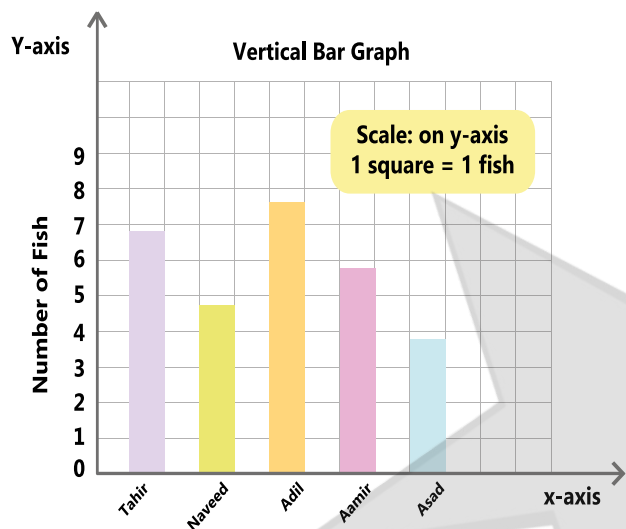
iii. How many kids did like chocolate flavour?

iv. How many kids like vanilla flavour?

v. Which flavour of the ice-cream did most of the kids like?



5. Look at the graph and answer the questions given below.



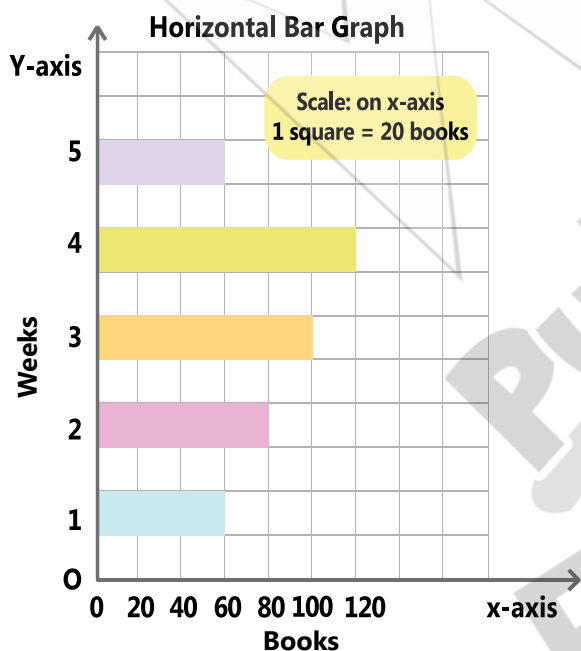
i. How many fish did Tahir catch?

ii. How many fish did Asad catch?

iii. How many more fish did Adil catch than Naveed?

iv. What is the average number of fish caught by each one?

6. The following bar graph shows the number of books sold by a shopkeeper over 5 weeks. Read the graph to answer the following questions.



i. How many books were sold in the 1st week?

ii. How many books were sold in the 2nd and 3rd week?

iii. How many books were sold in the 4th and 5th week?

iv. How many books were sold in all 5 weeks?

v. In which week maximum books were sold?

7. Use the data from the bar graph to answer the questions.

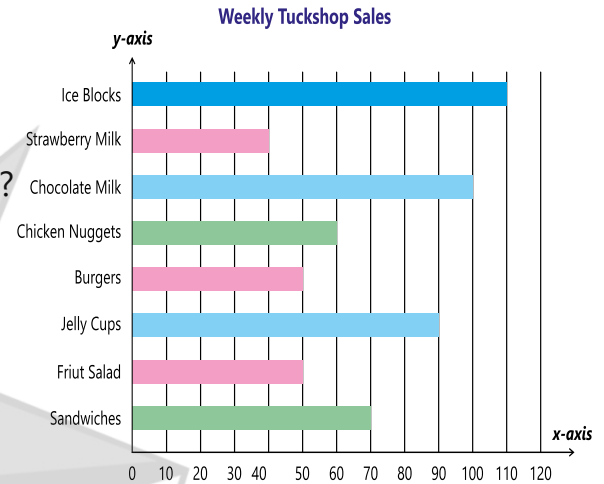
i. How many burgers were sold during the week?

ii. How many jelly cups were sold during the weeks?

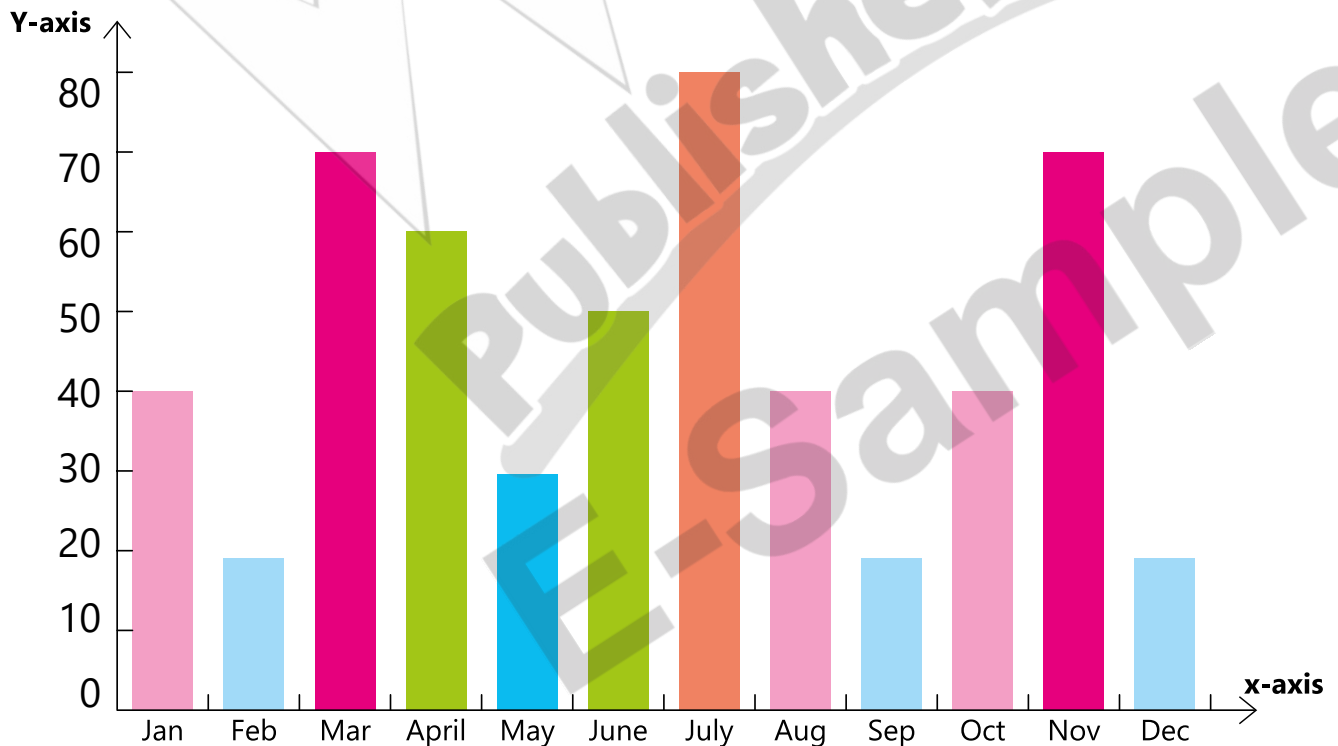
iii. What is the most popular item in the tuckshop?

iv. What is the least popular item?

v. How many more chocolate milks were sold than strawberry milks?



8. Here is an annual record of saplings planted in a farm.



- i. How many saplings were planted in the year 2016?

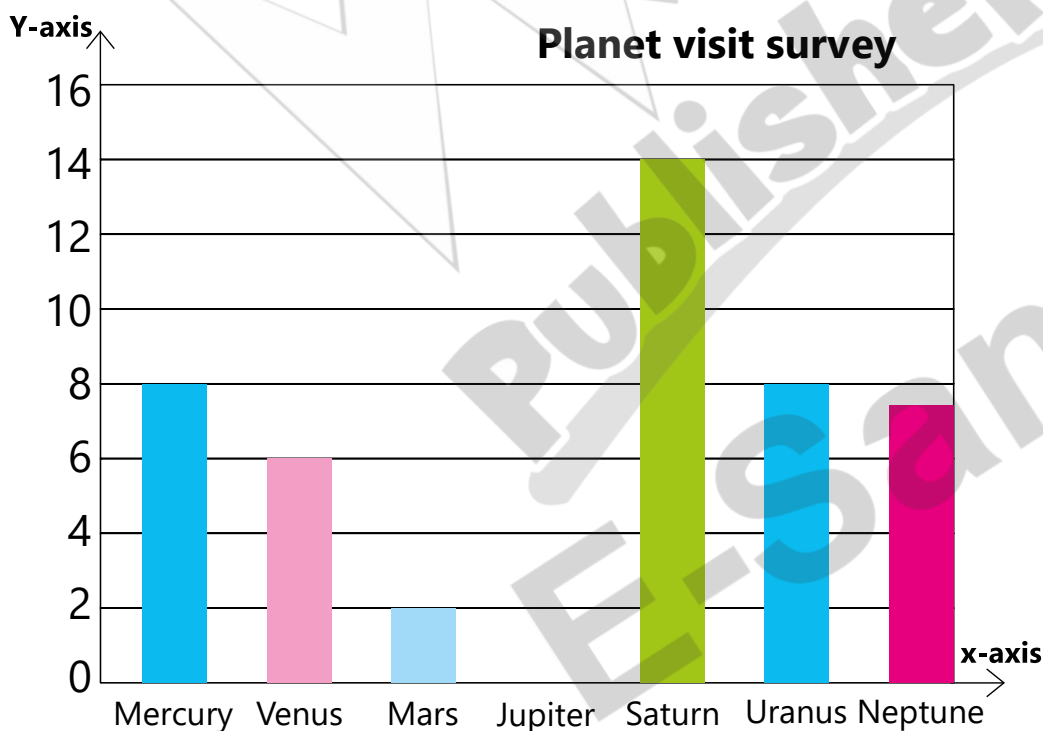
 - ii. In which month was least number of saplings planted?

 - iii. In which month was most number of saplings planted?

 - iv. How many more saplings were planted in July compared to June?

 - v. How many fewer saplings were planted in May compared to April?

9. Each child in ninth class selected two planets that they would like to visit.



Planets	Votes
Mercury	8
Venus	6
Mars	2
Jupiter	11
Saturn	14
Uranus	8
Neptune	7

- i. Draw a bar to show how many votes Jupiter got?

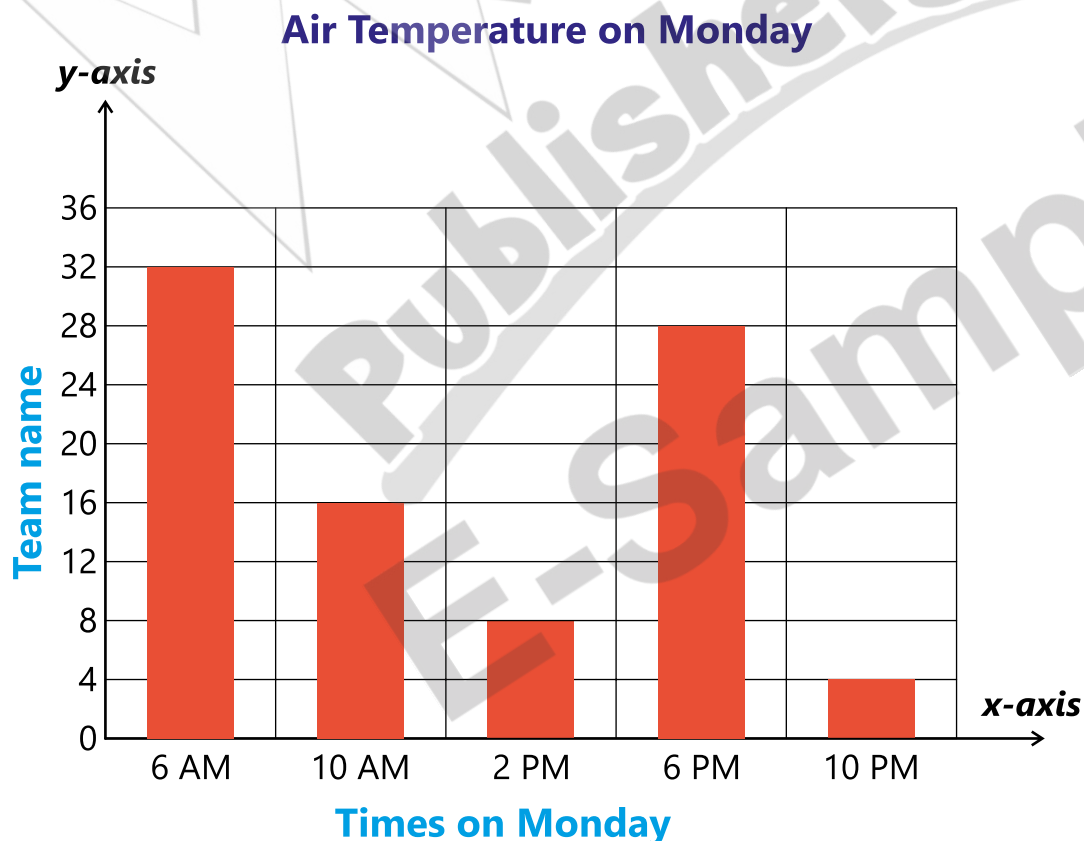
 - ii. Which was the most popular planet to visit?

 - iii. How many more votes did Saturn get than Uranus?

 - iv. How many more votes did Mercury get than Mars?

 - v. Which two planets got the same number of votes?

10. Answer the following questions based on the bar graph.



i. What was the air temperature at 6 pm?

ii. What was the air temperature at 6 am? ®

iii. Did the temperature increase or decrease between 6 am and 10 am?

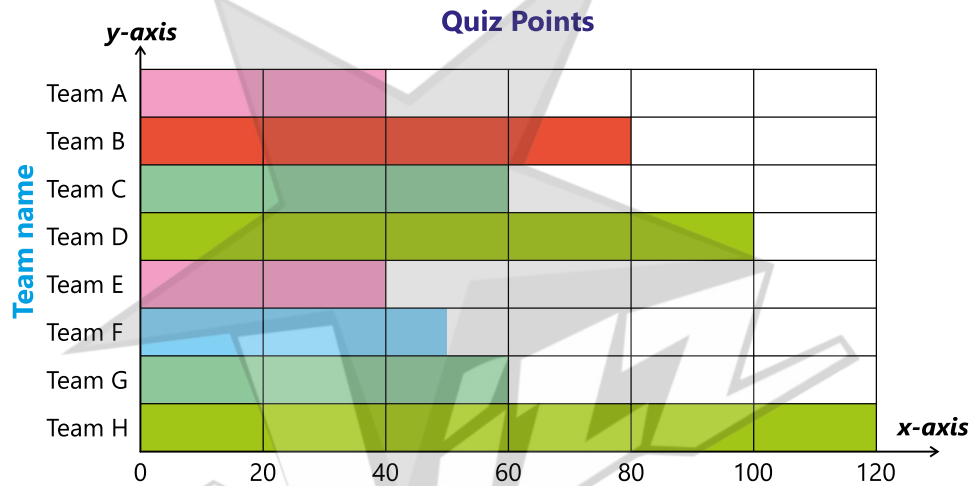
iv. Was the temperature higher at 2 pm or 10 pm?

v. At what time was the temperature at the lowest?





1. Eight teams joined a quiz competition. Their final scores are shown below. Study the graph and answer the questions.



- i. Which team won the contest?

- ii. How many points did Team F score?

- iii. How many more point did Team D get than Team G?

- iv. Which teams scored equally?

- v. What is the difference in the amount of points Team E scored and the amount Team H scored?

- vi. How many teams scored less than 100 points?

vii. What is the average points of the top four teams?

2. The children in Salamander class had a vote to find their most popular shape. Each child had 2 votes.

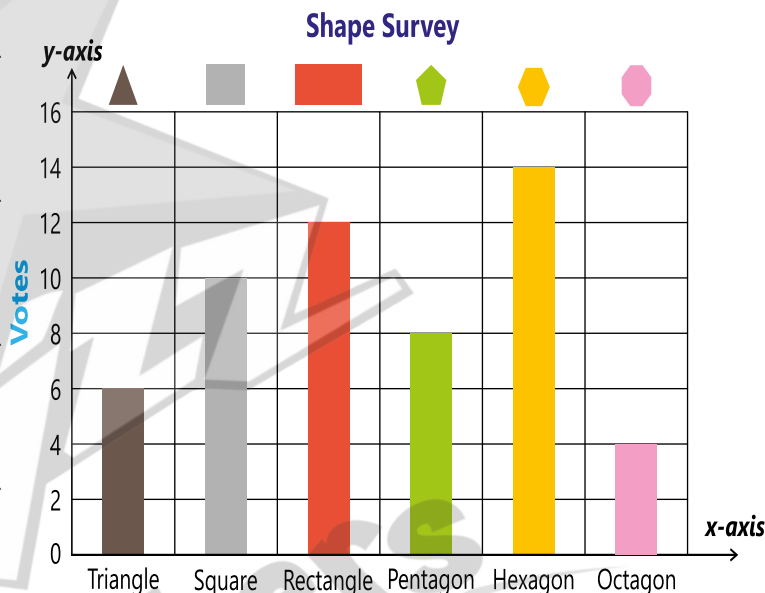
i. What was the most popular shape?

ii. What was the least popular shape?

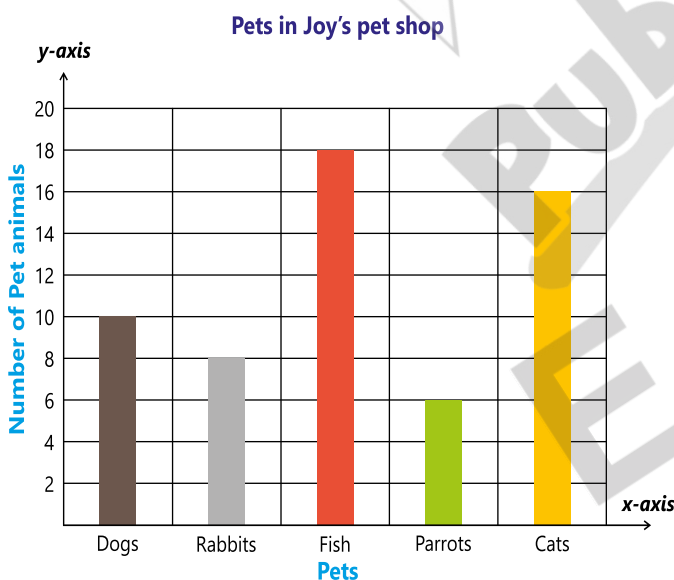
iii. How many voted for the pentagon?

iv. How many voted for the triangle?

v. How many voted for the rectangle?



3. Study the bar graph. Use the information from the graph to answer the questions below.



i. How many rabbits are there in Joy's shop?

ii. How many fish are there in Joy's shop?

iii. How many cats are there in Joy's shop?

iv. Are there more dogs or parrots?
