

<b>Subject:</b> Mathematics	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 1 – Rational Numbers</b> <b>Work Sheet – 1</b>
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>Understanding and Extending the concept of number family from Natural numbers to rational numbers</li> <li>Forming and Comparing rational numbers</li> <li>Computing with accuracy and verifying</li> <li>Applying to solve daily life problems</li> <li>Representing and referencing</li> </ul>	<ul style="list-style-type: none"> <li>Identifies and compares rational numbers</li> <li>Understands properties of rational numbers</li> <li>Links with daily life and finds suitable condition for applying the concept</li> <li>Applies operations on rational numbers</li> <li>Represents rational numbers on number line</li> <li>Finds rational numbers between two rational numbers</li> </ul>	<ul style="list-style-type: none"> <li>Individual</li> <li>Group work</li> <li>ICT,</li> <li>Mathematics lab activities</li> <li>Oral test</li> </ul>

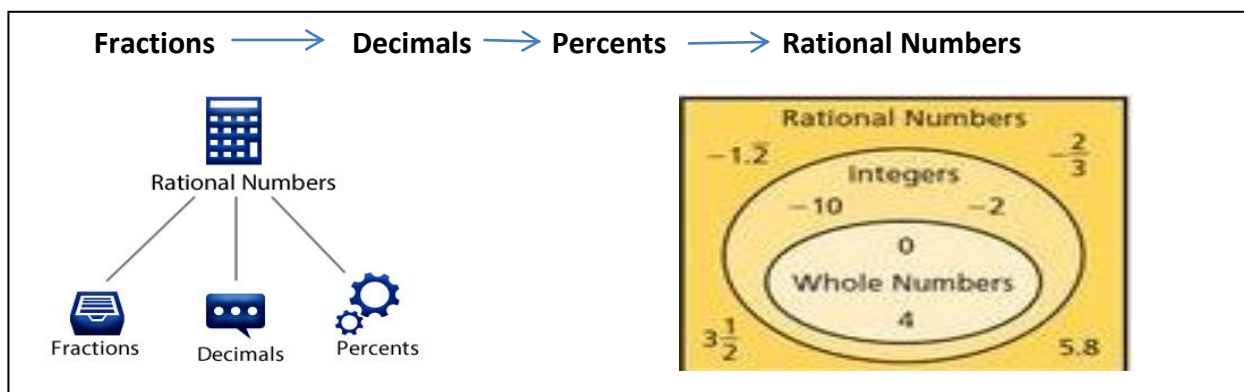
Sample Activity: 1

TLO: Identifies and compares rational numbers

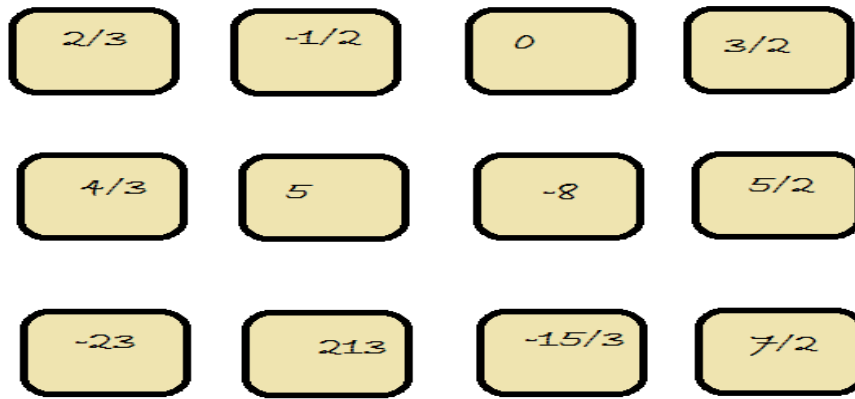
**Overview:**

Teacher can discuss how we use fractions and decimals in everyday life, such as in recipes, tools, medicine dosages, etc

Discussion will include why fractions and decimals are important to each of us



Students may be asked to arrange the cards in ascending or descending order of rational numbers by converting them into decimals.



Sample Activity 2

TLO: Represents rational numbers on number line

**Classroom Activity: Large graph paper and mass involvement of students needed**

Comparing numbers using a number line (Negative rational Numbers)

Students may be asked to represent the rational numbers on number line.

PROBLEM	NUMBER LINE	COMPLETED STATEMENT
a. $1 ? 6$		$1 < 6$
b. $-5 ? 5$		$-5 < 5$
c. $1.5 ? \frac{1}{2}$		$1.5 > \frac{1}{2}$
d. $-\frac{1}{4} ? -6.75$		$-\frac{1}{4} > -6.75$
e. $-3 ? -\frac{1}{3}$		$-3 < -\frac{1}{3}$
f. $-\frac{1}{6} ? -\frac{1}{3}$		$-\frac{1}{6} > -\frac{1}{3}$

### Learning Assessment:

1. Represent the following rational numbers on the number line  
(a)  $-\frac{1}{4}$  (b)  $-1\frac{1}{5}$  (c)  $-3\frac{8}{5}$
2. Find two rational numbers between (i)  $-2$  and  $2$ . (ii)  $-1$  and  $0$ .
3. Insert six rational numbers between (i)  $-\frac{1}{3}$  and  $-\frac{2}{3}$  (ii)  $\frac{1}{4}$  and  $\frac{1}{2}$ .
4. Arrange the following numbers in descending order:  $-\frac{5}{6}$ ,  $-\frac{7}{12}$ ,  $-\frac{13}{28}$ ,  $\frac{23}{-24}$
5. Represent  $4\frac{2}{3}$  on the number line.
6. What number should be added to  $\frac{-7}{8}$  to get  $\frac{4}{9}$ ?
7. The sum of two rational numbers is  $\frac{-1}{2}$ . If one of the numbers is  $\frac{5}{6}$ , find the other.
8. After reading  $\frac{7}{9}$  of a book, 40 pages are left. How many pages are there in the book?
9. A drum full of rice weights 4016 kg. If the empty drum weights 1334 kg, find the weight of rice in the drum.
10. Raju earns Rs16000/month. He spends  $\frac{1}{4}$  of his income on food;  $\frac{3}{10}$  of the remainder on house rent and  $\frac{5}{21}$  of the remainder on education of children. How much money is still left with him?

<b>Subject:</b> Mathematics	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 2</b> <b>(Linear Equations In One Variable)</b> <b>Work Sheet – 2</b>
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<b>Skill/ Competency/Concept</b>	<b>Target Learning Outcomes</b>	<b>Suggested Strategies</b>
<ul style="list-style-type: none"> <li>• Formation and solution of linear equation</li> <li>• Reducing equation in simpler form</li> <li>• Problem solving</li> </ul>	<ul style="list-style-type: none"> <li>• Frames linear equation</li> <li>• Solves linear equation having variable in one side as well as on both sides</li> <li>• Solves word problems based on linear equation</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Mathematics lab activities</li> </ul>

Sample Activity:-1

TLO: Framing of linear equation

From the given table choose any one item from each Column to form an equation .

<b>Coefficient</b>	<b>Variable</b>	<b>Operation</b>	<b>Number</b>	<b>Sign of equality</b>	<b>Number</b>
8	Z	+	7	=	-5
6	P	-	1	=	8
1	S	(-)	16	=	10
-3	A	+	4	=	1
17	R	+	12	(=)	4
7	B	-	12	=	(63)
4	(Y)	-	(18)	=	3
(9)	X	X	6	=	6
2	C	-	20	=	2
8	Q	-	-2	=	20

For examples: The items chosen in each column are shaded:

$$9y - 18 = 63$$

$$9y = 63 + 18$$

$$9y = 81$$

$$y = 9$$

Form at least 10 such equations and solve them (find the value of variable).

### Sample Activity: 2

Frame a linear equation involving one variable whose solution is 10.

i.e.  $2X + 5 = 25$

## Learning Assessment

1. Check whether the LHS and RHS are equal for the given values of x

(i)  $8x - 3 = 4x + 5$  for  $x = 2$

(ii)  $4(x - 5) = 21$  for  $x = 11$

2. Complete the following table :

No.	Statement	Linear equation
(i)	Half a number plus 6 is 11	
(ii)	The ratio of two numbers is 7:2 and the sum is 18	
(iii)	A car travels at a speed of s km/hr from Bhopal to Indore. After the journey of 3 hours, Indore is still 65 km away. Express the distance from Bhopal to Indore using variable S.	

(iv)	If 11 is subtracted from half of a number the result is 4	
(v)	Twice of a number added to half of the number equals to 25. Find the number	

3. Solve the following linear equations:

(i)  $3X+5 = 14$

(ii)  $Y- 3 = 12$

(iii)  $2(x-5) = 15$

4. If father is twice as old as his son and also 29 years older than his son. What is the age of father?
5. If you subtract  $\frac{1}{2}$  from a number and multiply the result by  $\frac{1}{2}$ , you get  $\frac{1}{8}$ . What is the number?
6. The perimeter of a rectangular swimming pool is 154 metres. Its length is 2 m more than twice its breadth. What are the length and breadth of the pool
7. Three consecutive integers are as such when they are taken in increasing order and multiplied by 2, 3, and 4 respectively, they add up to 74. Find these numbers
8. The ages of Rahul and Haroon are in the ratio of 5:7. Four years from now sum of their ages will be 56 years. Find their present age.

<b>Subject:</b> Mathematics	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 3</b> <b>(Understanding Quadrilaterals)</b> <b>Work Sheet – 3</b>
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Classification of polygons</li> <li>• Interior / exterior angle sum property of polygons</li> <li>• Various parallelograms and their properties</li> <li>• Problem solving</li> </ul>	<ul style="list-style-type: none"> <li>• Identifies polygons</li> <li>• Understands diagonals of polygons</li> <li>• Understands properties of quadrilaterals based on sides, angles, diagonals</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Demonstration</li> <li>• Mathematics lab activities</li> </ul>

Sample Activity – 1

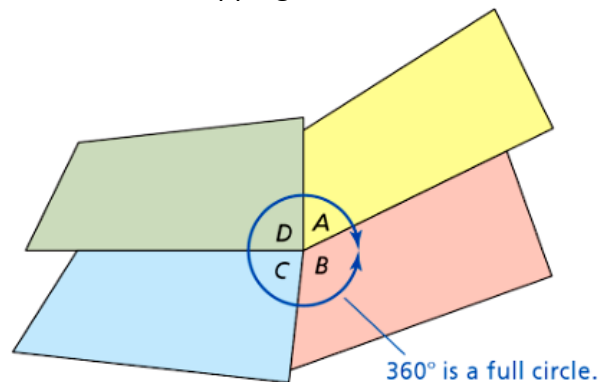
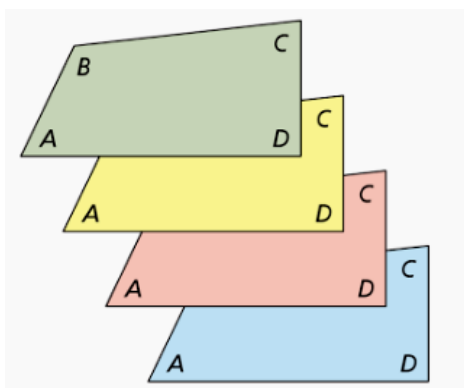
TLO: Angle sum property of a Quadrilateral

**To verify the sum of the interior angles of a quadrilateral is  $360^\circ$  by using activity method.**

- Draw a quadrilateral ABCD.



- Make three copies of the quadrilateral. Arrange four vertices, one from each quadrilateral so that they meet at a point without overlapping.



- Ask the student to observe:  
Four angles form a \_\_\_\_\_  
Full circle represents angle \_\_\_\_\_

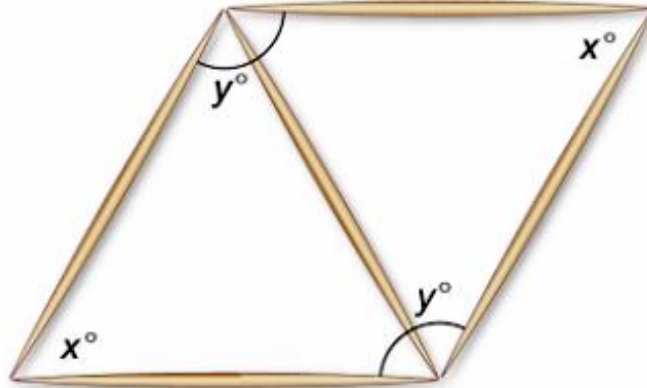
Thus, the sum of the interior angles of a quadrilateral is  $360^\circ$

## Sample Activity – 2

TLO: Opposite angles of a Parallelogram are equal

**To verify that the opposite angles of a parallelogram are equal, by using activity method.**

- Take 5 toothpicks to form a parallelogram and one diagonal.



- Find the measures of the two acute angles and two obtuse angles.
- Toothpicks are of same length, therefore each triangle is an equilateral triangle. So, let  $x = 60^\circ$ .
- Each of the acute angles of a parallelogram has a measure of  $60^\circ$ . So,  $y$  equals to  $2 \times 60^\circ = 120^\circ$ .
- Ask students to observe and make the conclusion
- The opposite angles of a parallelogram are equal

### Suggested Activities

- To verify that the sum of all the exterior angles of a triangle is  $360^\circ$  by using activity method.
- To verify that opposite sides of parallelogram are equal by using activity method.
- To verify that the diagonals of a rectangle are equal by using activity method.

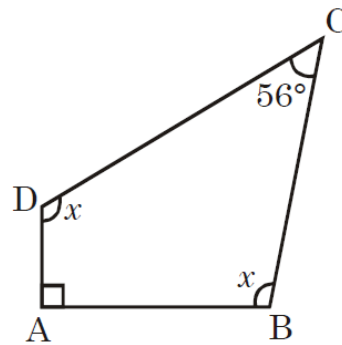
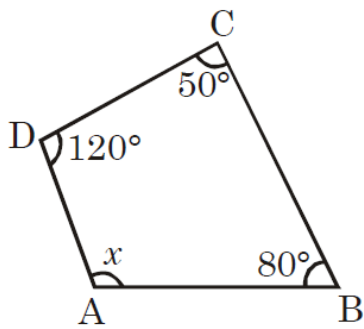
### Learning Assessment

1. If all the angles of a parallelogram are equal. Prove that it is a rectangle.
2. Find the length of the diagonal of a rectangle whose length is 15cm and breadth is 8cm.
3. The measure of two adjacent angles of a quadrilateral are 110 and 50 and the other two acute angles are equal. Find the measure of each angle.
4. The five angles of a pentagon are in the ratio 5 : 6 : 7 : 8 :10. Find all the angles.
5. GOAL is a quadrilateral in which  $GO \parallel AL$ . If  $\angle G = \angle O = 40^\circ$ . What are the measures of  $\angle A$  and  $\angle L$ .



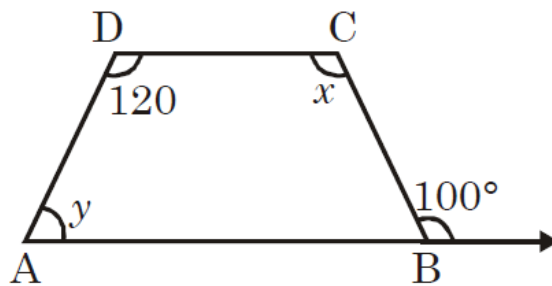
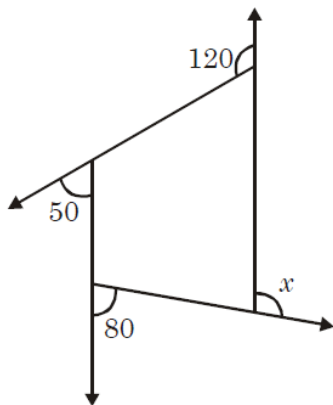
6. The ratio of two adjacent sides of a parallelogram is 5:4. Its perimeter is 18 cm then, what is the length of the adjacent sides.

7. In the below figure, ABCD is a quadrilateral. Find  $x$ .



8. In the above right sided figure, ABCD is a quadrilateral. Find  $x$ .

9. In the below figure. Find  $x$ .



10. PQRS is a parallelogram and diagonals  $PR$  and  $SQ$  bisect at  $O$ . If  $PO = 3.5$  cm and  $OQ = 4.1$  cm. What is the length of the diagonals?

<b>Subject:</b> Mathematics	<b>Level:</b> B2	<b>Class:</b> VIII	<b>Lesson:</b> 4(Practical Geometry) Work Sheet – 4
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Extending the concept of construction from line to Quadrilateral</li> <li>• Developing relationship between vertices and edges</li> <li>• Drawing, comparing and constructing skills</li> <li>• Analyzing and applying appropriate criterion</li> </ul>	<ul style="list-style-type: none"> <li>• Extends construction from basics to quadrilaterals</li> <li>• Identifies different parts and types of quadrilaterals</li> <li>• Applies suitable construction criterion</li> <li>• Links with acquired skill</li> <li>• Analyses and finds own way of constructing special quadrilateral</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• Geo board activity</li> <li>• Demonstration</li> <li>• Mathematics lab activities</li> </ul>

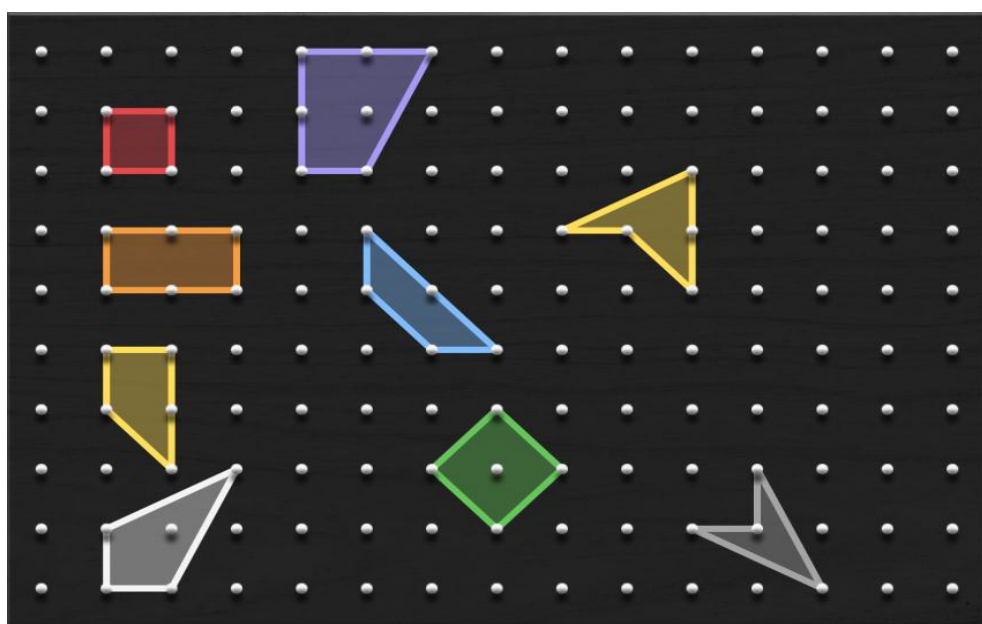
Sample Activity:1

TLO : Identifies different parts and types of quadrilaterals

Let's investigate quadrilaterals: Geo board activity (Coloured rubber bands)

Overview: Teacher can start with knowledge of quadrilaterals from pervious chapter.( Making Quadrilaterals on the geo board)

Through this activity properties can be explained in a concrete form.

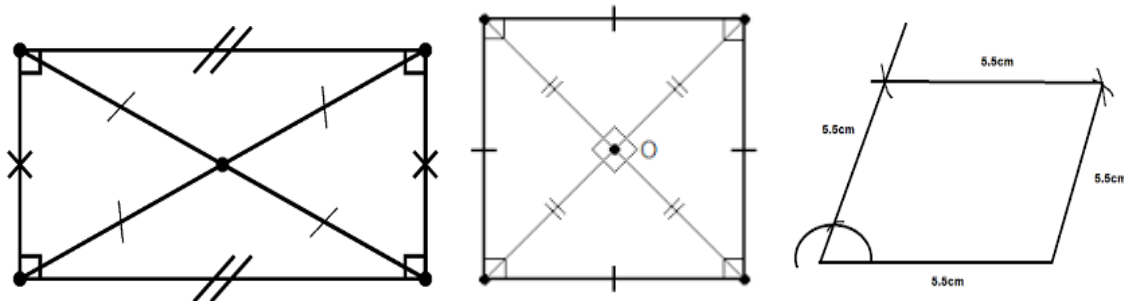


## Sample Activity 2

TLO : Analyses and finds own way of constructing special quadrilateral

Special quadrilaterals like Rectangle, Square, Parallelogram, Rhombus can be constructed with less mentioned ( actually fulfilling criterion) criterion through group activity.

Teacher may go with both giving complete and less mentioned criteria in parallel groups and observe the task.



### Suggested Activities

- (i) Teacher may show math lab objects and tools to explain criteria.
- (ii) Students may be asked to submit project and models made with sticks to form quadrilaterals following the criteria.
- (iii) Students may be asked to perform by paper folding activity to justify the constructions.

### Learning Assessment

What are the different criteria to construct quadrilaterals?

- (1) Is it possible to construct a quadrilateral with any three sides and two diagonals?
- (2) Is it possible to construct a quadrilateral with any three angles and any two sides?
- (3) If you want to construct a square, how many measures do you need? Take your own measurement and construct a square.
- (4) How many minimum measures do you need to construct-
  - a) Parallelogram
  - b) Rhombus
  - c) Rectangle
- (5) Construct rhombus for each of the following given measurements-
  - (a) Length of one side and one diagonal are respectively 4.5 cm and 6 cm .
  - (b) Length of one side is 6 cm and measure of one angle is  $60^\circ$  .
- (6) Construct the following special quadrilaterals.
  - (a) Construct a rectangle whose one side is 3 cm and one diagonal is equal to 5 cm

(c) Construct a square having each diagonal 5 cm long

### Test Yourself

(1) Arrange the following numbers in descending order:  $-\frac{5}{6}$ ,  $-\frac{7}{12}$ ,  $\frac{-13}{28}$ ,  $\frac{23}{-24}$

(2) Find four rational numbers between  $-\frac{5}{7}$  and  $\frac{3}{14}$

(3) Solve the equation:  $3y + \frac{5}{2} = \frac{19}{3} - 2y$

(4) Solve the equation by opening the brackets:

$$11(x - 3) - 4(x - 9) + 5(x + 2) = 0$$

(5) Ramesh is twice as old as Dinesh. Five years ago his age was three times Dinesh's age. What will be their age after 10 years?

(6) Find the number of sides of a regular polygon whose each interior angle has a measure of  $108^\circ$

(7) The angles of a quadrilateral are in the ratio of 1:2:3:4, find the angles?

(8) Draw an angle of  $75^\circ$  with help of compasses and draw its bisector.

(9) Draw a line segment  $AB = 5.6$  cm and draw its perpendicular bisector.

(10) Construct a quadrilateral MATH, where  $MA = 4$  cm,  $AT = 5$  cm,  $TH = 6.5$  cm,  $\angle A = 105^\circ$  and  $\angle T = 80^\circ$

<b>Subject:</b> <b>Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 5(Data Handling)</b> <b>Work Sheet – 5</b>
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>Organizing data</li> <li>Analyzing data</li> <li>Skill of pictorial representation</li> <li>Drawing conclusion</li> </ul>	<ul style="list-style-type: none"> <li>Knows about data</li> <li>Understands distribution table, bar graph, pie chart</li> <li>Differentiates bar graph and histogram</li> <li>Applies probability</li> </ul>	<ul style="list-style-type: none"> <li>Individual</li> <li>Group work</li> <li>ICT,</li> <li>Mathematics lab activities,</li> <li>Survey</li> </ul>

Sample Activity: 1

TLO: Understands distribution table, bar graph, pie chart

(1) Students be asked to collect the data of their class as per given details:

Mode of transport to come to school	Bicycle	On foot	Auto/taxi	Public transport	Any other mode
No. of student					

(2) Draw bar graph for above data

(3) Teacher may ask questions based on bar graph drawn

Sample Activity: 2

TLO: Understands distribution table, bar graph, pie chart

(1) Collect information from your class about which sports among the following, is each ones favorite and write it down against the name of the pupil.

Football, basketball, cricket, handball,

(2) Now organize the data using tally marks.

### Learning Assessment:

- (1) Find the mean of first ten prime numbers.
- (2) Name the possible outcomes when two coins are tossed together.
- (3) Draw the bar graph for the following data:

Classes	VI	VII	VIII	IX	X
No. of students enrolled	30	35	38	40	34

- (4) Draw a pie-chart for the following given information:-

Movie preferences of children polled at mall.

Comedy	Drama	Cartoon	Action	Suspense
24	14	36	26	20

Choose proper scale for the above.

- (5) The marks obtained by 30 students of class VIII in a class test (out of 10) are as under:  
8, 7, 5, 2, 1, 6, 0, 9, 10, 7, 5, 2, 1, 6, 0, 10, 9, 5, 4, 3, 8, 2, 7, 7, 6, 9, 5, 4, 8, 3,
  - (i) Prepare a frequency distribution table using tally marks
  - (ii) Draw a histogram to illustrate it.

<b>Subject:</b> Mathematics	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 6</b> <b>(Squares And Square Roots)</b> <b>Work Sheet – 6</b>
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Skill of knowing square number by observing unit digit</li> <li>• Finding square of a number by different methods</li> <li>• Finding square root of a number by different methods</li> <li>• Estimation of square root of a number</li> <li>• Applying knowledge of square roots</li> </ul>	<ul style="list-style-type: none"> <li>• Knows about square numbers</li> <li>• Finds square of numbers</li> <li>• Understands relationship of square number and its square root</li> <li>• Understands various methods to find square root</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Mathematics lab activities</li> </ul>

### Sample Activity - 1

**TLO: Use of squares and square roots.**

Complete the magic square below.

Use the numbers  $-4, -3, -2, -1, 0, 1, 2, 3, 4$  and  $5$  to make a magic square with row, column and diagonal sums of  $9$ .

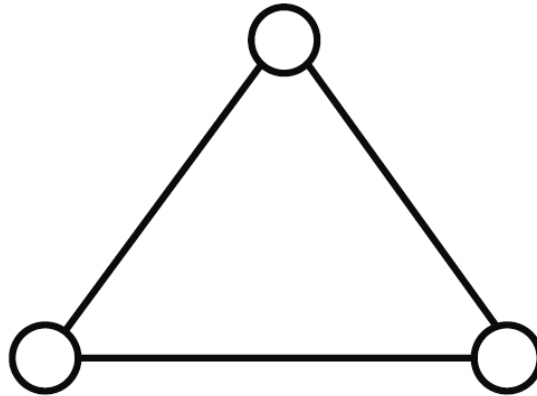
(A magic square is a square with numbers arranged so that the sum of the numbers in each row, column and diagonal is the same)

$2^2$		$\sqrt{36}$
	$2^2 - 1$	$2^2 - \sqrt{9}$
	$(5^2 - 4^2) - 2$	

## Sample Activity - 2

**TLO:** Use of perfect square numbers.

Put three different numbers in the circles so that when you add the numbers at the end of each line you always get a perfect square.



## Learning Assessment

1. How many 2's are there in the prime factors of 300?
2. How much is  $45^2 - 44^2$ ?
3. Find the value of  $(39 + 21)^2$ .
4. Simplify and give the answer:  $\sqrt{62 \times 28}$ .
5. Find the least number which when added to 599 to make it a perfect square.
6. In a cinema hall 729 people are seated in such a way that the number of people in a row is equal to number of rows. Then how many rows of people are there in the hall?
7. The length of a rectangular park is 80m and breadth is 60m. Find the length of its diagonal.
8. Give one Pythagorean triplet in which one of the number is 12.
9. Find the smallest number which when multiplied by 180 makes it a perfect square.
10. If the area of a square is 38.44 sq. cm., find the side of the square.



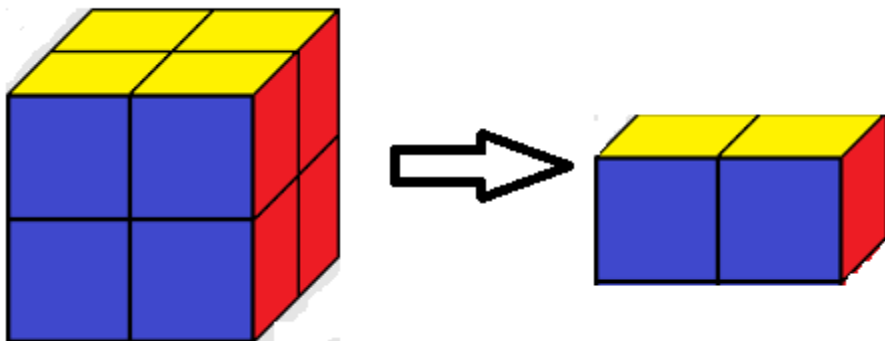
<b>Subject: Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 7 (Cubes And Cube Roots) Work Sheet – 7</b>
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Skill of knowing cube number by observing unit digit</li> <li>• Finding cube root of a number by prime factorization method</li> <li>• Estimation of cube root of a number</li> <li>• Applying knowledge of cube roots</li> </ul>	<ul style="list-style-type: none"> <li>• Knows about cube numbers</li> <li>• Understands relationship of cube number and its cube root</li> <li>• Understands methods to find cube root</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Mathematics lab activities</li> </ul>

### Sample Activity

TLO: Understanding methods to find cube root

- (1) Students will be given 8 small cubes (dice) to form a larger cube.
- (2) The number of cubes in each side of larger cube is the cube root of 8 (i. e. 2)



### Learning Assessment

1. The volume of a cubical box is 19.683 cu. cm. Find the length of each side of the box.

2. Find the smallest number by which the number 108 must be multiplied to obtain a perfect cube
3. Find the smallest number by which the number 88 must be divided to obtain a perfect cube.
4. The volume of a cube is  $64 \text{ cm}^3$ . Find the side of the cube.
5. Find the smallest number by which  $(2 \times 2 \times 3 \times 3 \times 3)$  is to be multiplied so that resultant number is a perfect cube.
6. Three solid wooden cubes of different colours with sides, 30 cm are placed side by side. How much cubic cm of wood is required to make it?
7. A cubical box has a volume of 512000 cubic cm. What is the length of the side of box?
8. Find the value of  $\frac{\sqrt[3]{729} - \sqrt[3]{27}}{\sqrt[3]{512} + \sqrt[3]{343}}$ .

<b>Subject: Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 8 (Comparing Quantities) Work Sheet – 8</b>
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Understanding the concepts of ratio, percentage and money transaction</li> <li>• Remembering and forming the formulae</li> <li>• Comparing and analyzing the cases</li> <li>• Computing accurately and timely</li> <li>• Applying the concepts to day to day based life activities and problem solving</li> </ul>	<ul style="list-style-type: none"> <li>• Derives and understands the formulae as generalization of cases</li> <li>• Understands and Skilled to use ratios and percentage to compare the quantities</li> <li>• Links with real life influenced fully with money transaction, comparing, savings and percentage</li> <li>• Applies the concepts to solve problems from different spheres using the concepts in own ways</li> <li>• Finds problems and solves for which simple and compound interest applies</li> </ul>	<ul style="list-style-type: none"> <li>• Money transaction game ( Dummy Currencies)</li> <li>• Group work</li> <li>• ICT,</li> <li>• Dummy market</li> <li>• Class activity-</li> <li>• Buyer Seller</li> <li>• Borrower-Depositor</li> </ul>

Sample Activity -1

TLO: Understands the ratio and percentage

**Class Activity:**

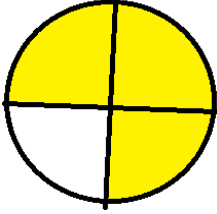
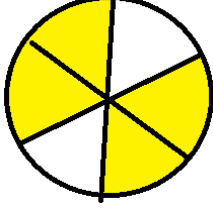
Both help us to compare: **Ratio and Percentage**. Are they related to each other?

Teacher can show various same sized shapes whose different parts are shaded.

Students may be asked to convert shaded parts of each circle in fraction.

Students may be asked to convert these fractions in percent and compare the shaded parts.

Convert to percent				Convert from percent			
Fraction	$\frac{1}{2}$	Multiply by 100	50 %	25 %	Divide by 100	$\frac{1}{4}$	Fraction
Ratio	1:2					1:4	Ratio
Decimal	0.5					0.25	Decimal

Shaded parts of circles		
Fraction	$\frac{3}{4}$	$\frac{4}{6}$
In percent	$\frac{3}{4} \times 100 = 75\%$	$\frac{4}{6} \times 100 = 66.66\%$
Comparison	Larger	

### Sample Activity -2

TLO: Finds problems and solves for which simple and compound interest applies

### Bank and Customer Activity

Teacher can organize an activity which involves purchasing, depositing and borrowing money, cases of simple and compound interest.

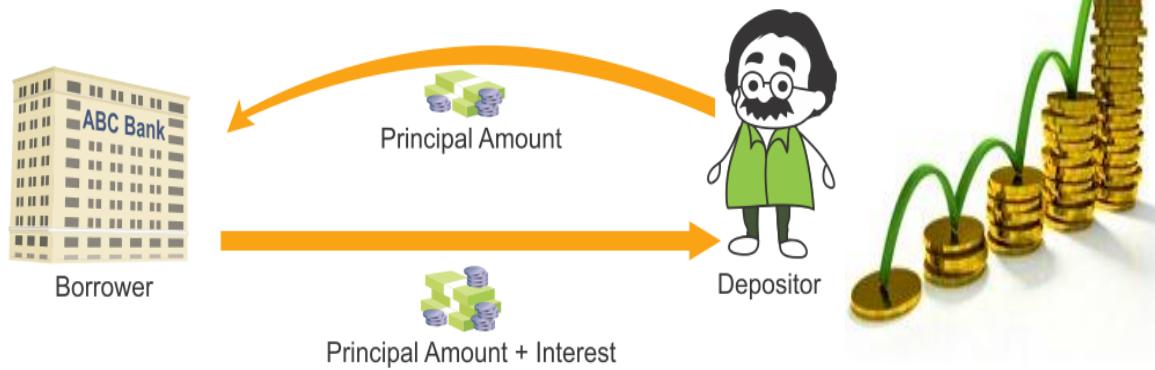
Teacher can involve all the students using dummy currencies to explain Profit, Loss, Simple Interest and Compound Interest starting with Rs 100 or Rs 1000

Interest calculated on the original principal throughout the holding period.

Simple Interest =

Interest calculated on the original principal throughout the holding period.

$$\text{Simple Interest} = \frac{\text{Principal} \times \text{Time} \times \text{Rate of Interest}}{100} = \frac{\text{PTR}}{100}$$



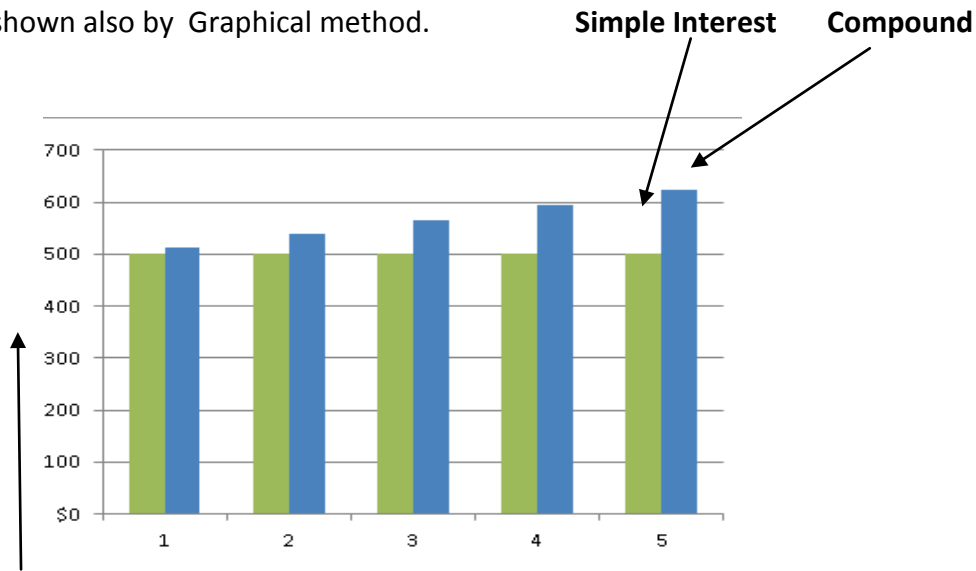
Comparison of Simple Interest and Compound Interest for the same Principal may be discussed thoroughly .

Comparison @ 10% per annum for principal of Rs 100

Simple Interest			Compound Interest		
Year	Principal	Interest	Year	Principal	Interest
1	100	10	1	100	10
2	100	10	2	110	11
3	100	10	3	121	12.1
4	100	10	4	133.1	13.3
5	100	10	5	146.4	14.6
6	100	10	6	161.1	16.1
7	100	10	7	177.2	17.7
8	100	10	8	194.9	19.5
<b>Total</b>	<b>100</b>	<b>80</b>	<b>Total</b>	<b>100</b>	<b>114.5</b>

It can be shown also by Graphical method.

**Interest**



**Suggested Activities:**

1. Teacher can organize classroom activity to convert students' marks in different subjects into percentage and compare performance in ratio and percentage.
2. Teacher can organize dummy market.

**Learning Assessment:**

1. Fill the final amount you will get in each case using simple interest.

Start Amount (Rs)	Interest	Years	Final Amount
360	10%	5	
420	12%	6	
500	15%	9	
680	11%	10	
1200	5%	12	
2400	4%	7	
3500	2.5%	6	
3600	3.5%	5	
4800	1.2	4	

2. Find the ratio of the following

(a) 25 km to 100 m      (b) 5.6 kg to 280 g

4. If 25% of x is 50, then find x

5. A shop keeper allows a discount of 15% on the written price. How much above the cost price must he mark his goods to make a profit of 15%.
6. Find the amount of Rs 2400 after 3 years, when the interest is compounded annually at the rate of 20% per annum. Also find the amount if this would be the case of simple interest.
7. By reducing the SP of an article by Rs. 50, a gain of 5% turns into a loss of 5%. Find the original SP of the article.
8. A dealer bought two tables for Rs. 3120. He sold one at a loss of 15% and other at a profit of 36%. If the selling price of each table set is same, find the cost price of each table.
9. Rakesh goes to a departmental store and purchases the following articles:
  - a. biscuits and bakery products costing Rs. 50, VAT @ 5%.
  - b. medicine costing Rs. 90, VAT @ 10%.
  - c. clothes costing Rs. 400, VAT @ 1% and
  - d. cosmetics costing Rs. 150, VAT @ 10%.
 Calculate the total amount to be paid by Rakesh to the store.

### Test Yourself

- (1) When a dice is thrown, list the outcomes of an event of getting  
 (a) a number divisible by 2 (b) a number divisible by 3.

- (2) The number of students admitted in different faculties of a college are given below:

faculty	science	arts	commerce	law	education	total
Number of students	1000	1200	650	450	300	3600

Draw a pie-chart to represent the above information.

- (3) Write a Pythagorean triplet whose smallest member is 18.
- (4) Find the smallest square number which is divisible by each of the numbers 3, 9 and 15.
- (5) Find the square root of each of the following numbers by Division method.  
 (i) 2116    (ii) 2809    (iii) 11236
- (6) Find the cube root of each of the following numbers by prime factorization method.  
 (i) 729 (ii) 2744
- (7) Find the cube root of 175616 through estimation.
- (8) 70% of 32 students are good in science. How many are not good in science?

- (9) A table marked at Rs 16,000 is available for Rs 15,500. Find the discount given and the discount per cent.
- (10) Find C I paid when a sum of Rs 12,000 is invested for 1 year and 3 months at 8% per annum compounded annually.

<b>Subject:</b> <b>Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 9</b> <b>(Algebraic Expressions &amp; Identities)</b> <b>Work Sheet – 9</b>
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Skill to differentiate like and unlike terms</li> <li>• Skill to find addition, subtraction and multiplication of algebraic expressions</li> <li>• Application of identities</li> </ul>	<ul style="list-style-type: none"> <li>• Identifies monomials, binomials and other polynomials</li> <li>• Finds addition and subtraction of algebraic expressions</li> <li>• Understands the process of multiplication of polynomials</li> <li>• Identifies identities</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Mathematics lab activities</li> <li>• Puzzles</li> </ul>

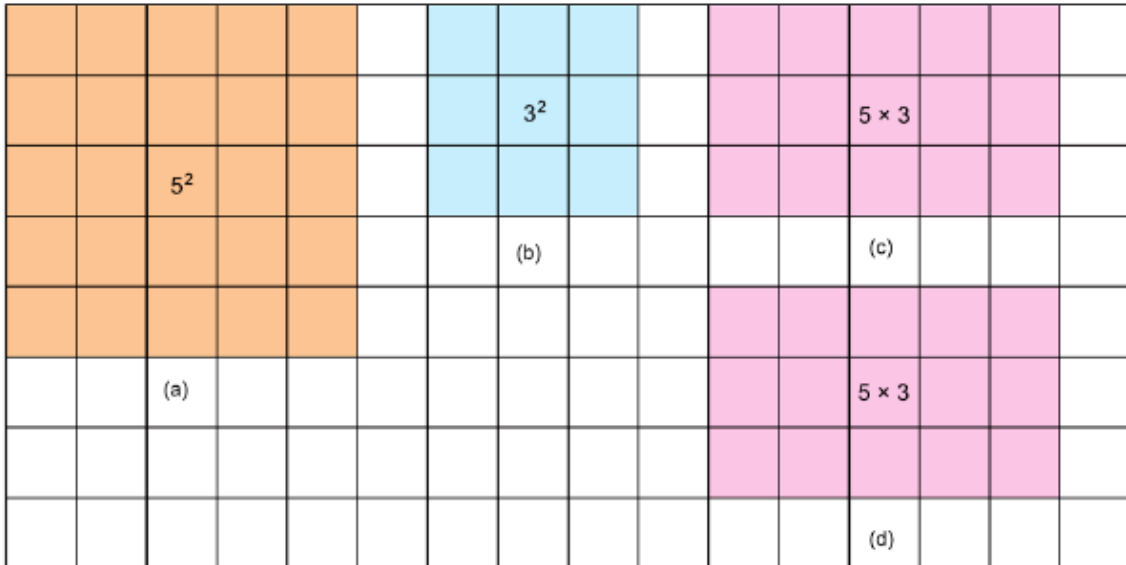
Sample Activity

- |   |
|---|
| <ul style="list-style-type: none"> <li>• <b>TLO:</b> Identifies monomials, binomials and other polynomials</li> </ul> |
|---|

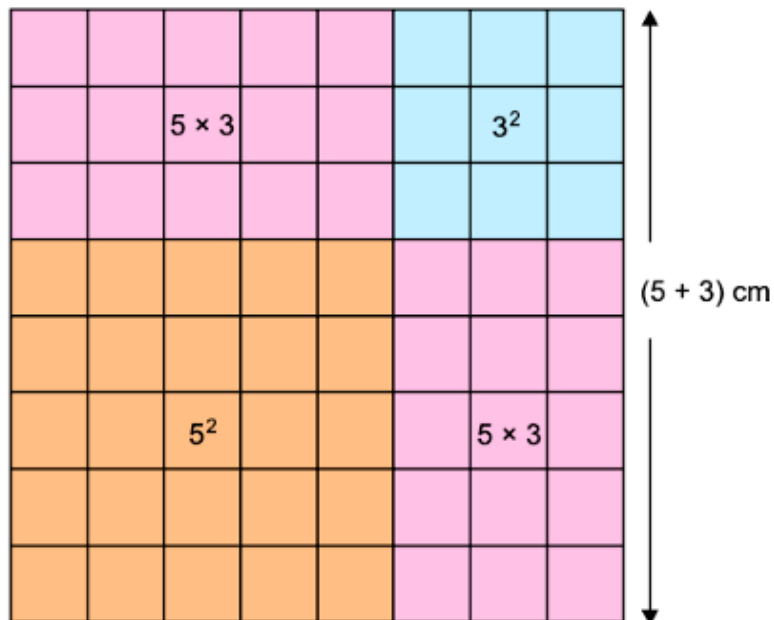


**To verify  $(a + b)^2 = a^2 + 2ab + b^2$  by using activity method**

- Take a graph paper/squared sheet paper, mark a square of side 5 cm, another square of side 3 cm and two rectangles each having sides 5 cm and 3 cm.
- Colour the two squares using two different colours and colour both the rectangles using a third colour.



- Write their areas in their respective regions.
- Now cut the squares and rectangles. Paste them on a sheet of paper to complete the square.



Ask students to observe:

Sum of the areas in first figure = \_\_\_\_\_

Area of the shape in second figure = \_\_\_\_\_

What do you observe?

The sum of the areas in first figure is equal to the area of the square in second figure. Both are 64 square units

Thus  $(5 + 3)^2 = 5^2 + 2 \times (5 \times 3) + 3^2$

i.e.  $(a + b)^2 = a^2 + 2ab + b^2$

### Suggested Activities

- To verify  $(a - b)^2 = a^2 - 2ab + b^2$  by using activity method
- To verify  $(x + a)(x + b) = x^2 + (a + b)x + ab$  by using activity method
- To verify  $(a - b)(a + b) = a^2 - b^2$  by using activity method

### Learning Assessment

(1) Add:  $2x^2 + 3xy + 1$  and  $x^2 + 5 + 4xy$

(2) Find the product of the following pairs of monomials:

(i)  $-2x, 3xy$  (ii)  $-4x^3, -7xy^2$

(3) Subtract  $2x(3y - 4z)$  from  $4x + 7zx - 2xy$

(4) Find the product:

(i)  $(3x + 1)(5y + x)$  (ii)  $(x + 2y)(2x - y)$

(5) Simplify using identity: (i)  $68 \times 72$  (ii)  $93^2$

<b>Subject:</b> <b>Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 10</b> <b>(Visualizing Solid Shapes)</b> <b>Work Sheet – 10</b>
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Skill to classify 2D and 3D shapes</li> <li>• Skill to represent various views of a solid</li> <li>• Skill to draw the map of a location</li> <li>• Application of Euler's formula</li> </ul>	<ul style="list-style-type: none"> <li>• Recognizes 2D and 3D shapes</li> <li>• Identifies top, front and side view of solids</li> <li>• Reads and draws maps</li> <li>• Understands various polyhedron</li> <li>• Knows Euler's formula</li> <li>• Verifies Euler's formula</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Mathematics lab activities</li> <li>• Demonstration</li> </ul>

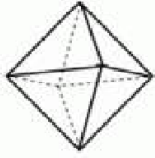
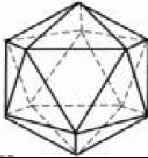
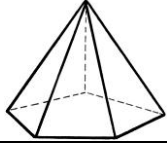
Sample Activity:

<b>TLO:</b> Verifies Euler's formula
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Verification of Euler's formula:

(1) Find the value of F, V and E by observing polyhedron.

(2) Putting the values in formula and verify it.

shape	F	V	E	$F + V - E = 2$
	8	6	12	$8 + 6 - 12 = 2$
	-----	-----	-----	-----
	-----	-----	-----	-----

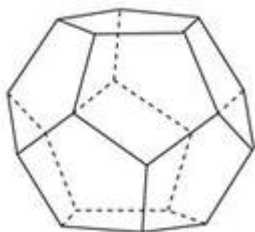
### Learning Assessment

(1) Draw two solid objects from your environment and find their top view, front view, and side view.

(2) Draw a map for your study room at your home using proper scale and symbols for different objects.

(3) Draw two examples of prism.

(4) Verify Euler's formula for given solid:



(5) Find number of edges in a polyhedron if it's number of faces and vertices are 20 and 12 respectively.

<b>Subject: Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 11(Mensuration) Work Sheet – 11</b>
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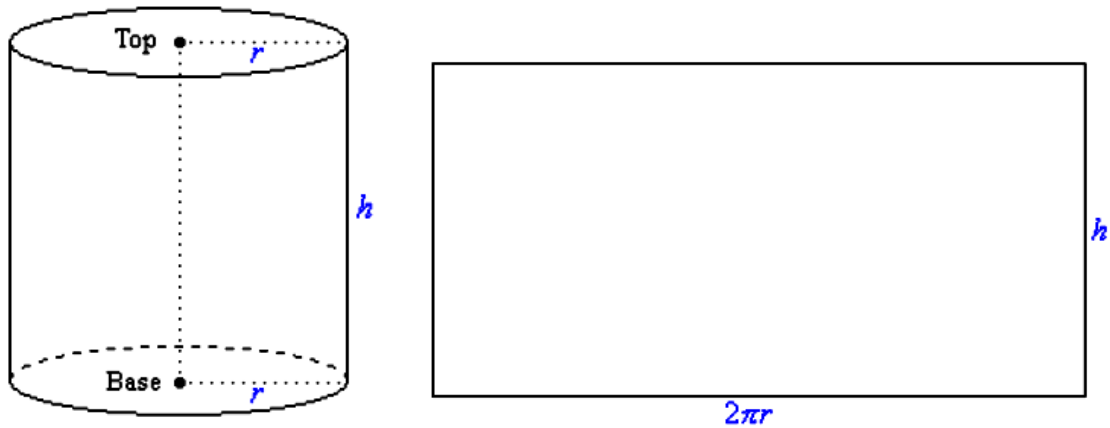
<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Conversion of measurements</li> <li>• Skill to form formula to find surface area of cube, cuboid and cylinder</li> <li>• Problem solving</li> </ul>	<ul style="list-style-type: none"> <li>• Understands of measurements</li> <li>• Finds area of trapezium and Polygons</li> <li>• Formation of formula to find surface area of cube, cuboid and cylinder</li> <li>• Finds surface area of cube, cuboid and cylinder</li> <li>• Finds volume of cube, cuboid and cylinder</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Mathematics lab activities</li> <li>• Demonstration</li> </ul>

Sample Activity

- |   |
|---|
| <ul style="list-style-type: none"> <li>• TLO: Formation of formula</li> </ul> |
|---|

To determine a formula for the curved surface area of a cylindrical can by activity method.

- Wrap a sheet of paper snugly around the can and tape it together.
- Trim the paper at the top and bottom to match the shape of the can.
- Then slide the paper off the can and cut this paper cylinder parallel to its axis so that it forms the rectangle shown in the following diagram.



- Clearly, the length of the rectangle = circumference of the base =  $2\pi r$
- The width of the rectangle = Height of the cylinder =  $h$
- Thus, Curved surface Area of the cylinder = Area of the rectangle =  $l \times b = 2\pi r h$

#### Suggested Activities

- To determine a formula for the total surface area of cuboid by activity method.
- To determine a formula for the total surface area of cube by activity method.

#### Learning Assessment

1. Find the side of a cube whose surface area is  $600 \text{ cm}^2$
2. The diagonals of a rhombus are 7.5 cm and 12 cm, find its area.
3. Find the height of a cuboid of volume  $100 \text{ cm}^3$ , whose length and breadth are 5 cm and 4 cm respectively.
4. Find the area of a trapezium, whose parallel sides are of length 16 dm and 22 dm and whose height is 12 dm.
5. Find the height of a cylinder whose radius is 7 cm and the total surface area is  $968 \text{ cm}^2$ .
6. The length, breadth and height of a room are 5 m, 4 m and 3 m respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of Rs 7.50 per  $\text{m}^2$ .
7. The floor of a rectangular hall has a perimeter 250 m. If the cost of painting the four walls at the rate of Rs 10 per  $\text{m}^2$  is Rs 15000, find the height of the hall.
8. A solid cube of side 12 cm is cut into eight cubes of equal volume. What will be the side of the new cube? Also, find the ratio between their surface areas.

9. The curved surface area of a right circular cylinder of height 14 cm is  $88 \text{ cm}^2$ . Find the diameter of the base of the cylinder.
10. In a hot water heating system, there is a cylindrical pipe of length 14 m and diameter 5 cm. Find the total radiating surface in the system.

<b>Subject: Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 12 (Exponents And Powers) Work Sheet – 12</b>
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<b>SKILL/ COMPETENCY/CONCEPT</b>	<b>TARGET LEARNING OUTCOMES</b>	<b>SUGGESTED STRATEGIES</b>
<ul style="list-style-type: none"> <li>• Understanding power notation as exponential form</li> <li>• Expressing the numbers in exponential form and using scientific notation( standard form)</li> <li>• Understanding and applying laws of exponent</li> <li>• Expressing and Comparing</li> </ul>	<ul style="list-style-type: none"> <li>• Understands the concepts of exponents and powers</li> <li>• Skills to solve sums related to exponents</li> <li>• Gets Knowledge of large and small numbers</li> <li>• Capable of expressing large and small numbers in standard form</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Class Group activity</li> <li>• ICT,</li> <li>• Quiz</li> </ul>

Sample Activity

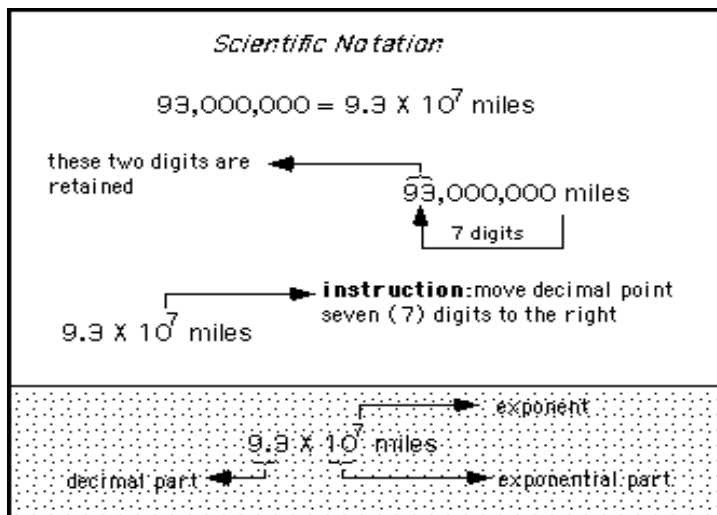
TLO : Capable of expressing large and small numbers in standard form
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**Go ahead or go back: Usual to Standard Notation**

Conversion of useful large/ small number in usual and standard form.

Student may be asked some useful and known large/small number.

Convert these numbers in standard form to usual form or usual form to standard form.



$$100 = 1 \times 10^2$$

$$4321 = 4.231 \times 10^3$$

$$1.23 = 1.23 \times 10^0$$

$$0.25 = 2.5 \times 10^{-1}$$

$$0.0007925 = 7.925 \times 10^{-4}$$

Let us convert

**$3500 = 3.5 \times 10^3$**     3.5 is between 1 and 10; we go from **larger number to smaller number**,

So we use a **Positive Exponent**

**$0.0000001 = 1 \times 10^{-7}$**     1 is between 1 and 10; we go from **smaller number to larger number** , So we use a **Negative Exponent**

**$0.123456 = 1.23456 \times 10^{-1}$**     1.234565 is between 1 and 10; we go from **smaller number**

to **larger number** , So we use a **Negative Exponent**

**$1000000 = 1 \times 10^6$**     1 is between 1 and 10 , we go from a **larger number to Smaller number**, so we use a **Positive Exponent**

Now Standard to Usual Notation:

1. Move decimal point to **RIGHT** for **POSITIVE** exponent of 10
2. Move decimal point to **LEFT** for **NEGATIVE** exponent of 10



$$2 \times 10^9$$

$$2.000000000$$

1 2 3 4 5 6 7 8 9

$$2,000,000,000$$

$8.9 \times 10^{-9}$   
As the given number in scientific form

Step 1: Exponent is negative 9 so put nine 0's before 8  
 $0000000008.9$

Step 2: As the exponent is 9 shift decimal 9 digits to left  
 $0.0000000089$

$0.0000000089$  Usual form

**Suggested Activities:**

1. Teacher can ask students to collect known and interesting number/s from other subjects and write them in scientific notation.
2. Teacher can motivate students to compute exponential numbers in their own way and verify with answer using proper method.

**Learning Assessment**

1. Fill in the blanks with proper notation

S. No.	Description of number	Usual form	Standard form
1.	The distance from Earth to the Sun	-----	$1.49 \times 10^{11}$ m
2.	The speed of light	300000000 m/sec	-----
3.	The average diameter of a Red Blood Cell	-----	$7 \times 10^{-6}$ mm
4.	The distance of moon from the Earth	-----	$3.84 \times 10^8$ m
5.	The size of a plant cell	0.00001275 m	-----

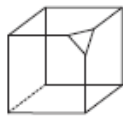
2. Evaluate: (i)  $\frac{1}{3^{-2}}$  (ii)  $\left(\frac{2}{3}\right)^{-4}$

3. Find the value of  $\left\{ \left(\frac{1}{3}\right)^{-3} - \left(\frac{1}{2}\right)^{-3} \right\} \div \left(\frac{1}{4}\right)^{-3}$

4. Find the value of  $\left\{6^{-1} + \left(\frac{3}{2}\right)^{-1}\right\}^{-1}$
5. By what number should  $(4)^{-1}$  be multiplied so that the product may be equal to  $(10)^{-1}$
6. Express the following numbers in standard form:
- (i) 652000000000      (ii) 0.000000000003125      (iii)  $3759 \times 10^{-4}$
7. Find the value of x for which  $3^{x+1} \div 3^2 = 3^5$
8. If  $\left(\frac{7}{12}\right)^{-4} \times \left(\frac{7}{12}\right)^{3x} = \left(\frac{7}{12}\right)^5$ , then find the value of x.

### Test Yourself

- (1) Add:  $5xy + 3yz - zx$ ,  $2yz + 9zx - 3y$ ,  $-7xz + x - 2xy$ .
- (2) Simplify the expressions and evaluate them as directed:  
 (i)  $x(x - 5) + 6$  for  $x = 1$ , (ii)  $y(2y - 1) - (y - 5) - 6$  for  $y = -2$
- (3) Show that.  
 (i)  $(x + 7)^2 - 28x = (x - 7)^2$
- (4) Verify Euler's formula for these solids.



- (5) The area of a trapezium shaped field is  $440 \text{ m}^2$ , the distance between two parallel sides is 20 m and one of the parallel side is 30 m. Find the other parallel side.
- (6) Find the height of a cylinder whose radius is 1.5 cm and the total surface area is  $297 \text{ cm}^2$ .
- (7) A godown is in the form of a cuboid of measures  $60 \text{ m} \times 40 \text{ m} \times 30 \text{ m}$ . How many cuboidal boxes can be stored in it if the volume of one box is  $0.8 \text{ m}^3$  ?
- (8) Find the value of (i)  $\left(\frac{1}{4}\right)^{-2}$       (ii)  $5^{-3} \times 5^{-6}$
- (9) Simplify:  $\frac{25 \times a^{-4}}{5^{-3} \times 10 \times a^{-8}}$
- (10) Write the following numbers in standard form.

(i) 0.0000003296 (ii) 0.000002751 (iii) 1450000000 (iv) 6970000

<b>Subject: Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 13 (Direct And Inverse Proportion) Work Sheet – 13</b>
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<b>Skill/ Competency/Concept</b>	<b>Target Learning Outcomes</b>	<b>Suggested Strategies</b>
<ul style="list-style-type: none"><li>• Understanding relation between two quantities</li><li>• Forming and analyzing mathematical relation from word problems</li><li>• Differentiating between direct and inverse proportions</li><li>• Comparing and Computing properly</li><li>• Applying for solving real life problems</li></ul>	<ul style="list-style-type: none"><li>• Understands the relation between two quantities</li><li>• Identifies and analyzes direct and inverse proportions</li><li>• Skills to represent word problems in mathematical form</li><li>• Correlates the concept to real life and applies to find the solution of problems.</li></ul>	<ul style="list-style-type: none"><li>• Individual</li><li>• Group work</li><li>• ICT,</li><li>• Mathematics lab activities</li><li>• Oral test</li></ul>

### Sample Activity 1-

TLO : Identifies and analyzes direct and inverse proportions

Cover Your Notebooks : (No of Notebooks, No of persons to work and Time taken.)

Teacher can conduct classroom activity to make the students understand.

A student covers a notebook in 10 minutes.

How many such notebooks can he cover in 30 minutes?



10 Min-1 NB , 20 Min-2 NB, 30Min-3NB

Relation between No of Notebooks and Time taken can be explained.  **$1/2 = 10/20$**

### Swachchh Bharat - Swachchh Vidyalaya

More the students, less the time

One person takes 2 hours to clean the playground. Now you are not alone, we are 10?

How much time will it take to complete the work if we work together?

2 Hours= 120 minutes (Total time needed =120 minutes)

Now we are 10 persons.

Time taken=  $120 / 10 = 12$  minutes ( If all work equally)



Activity based teaching leads and can be generalized as-

Direct Variation:  $y$  varies directly as  $x$ . As  $x$  increases,  $y$  also increases. As  $x$  decreases,  $y$  also decreases.

$$\text{Equation for Direct Variation: } y = kx$$

Inverse Variation:  $y$  varies inversely as  $x$ . As  $x$  increases,  $y$  decreases. As  $x$  decreases,  $y$  increases. The product of  $x$  and  $y$  is always constant.

$$\text{Equation for Inverse Variation: } xy = k$$

### Learning Assessment

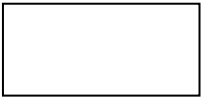
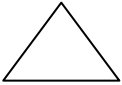
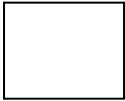
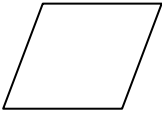
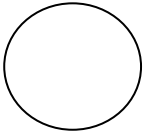
1. If 50 persons can consume a certain amount of food in 2 months, in how many months can 30 persons consume the same amount of food?
2. Reema types 540 words during half an hour, how many words would she type in 3 hours?
3. If the thickness of pile of 12 cardboards is 36 mm, find the thickness of pile of 108 cardboards.
4. If 36 men can do a piece of work in 18 days, in how many days will 72 men do it?
5. 18 men can reap a field in 54 days. For reaping the same field in 9 days, how many men are required.
6. Fill in the blanks-
  - (a) If  $x = 5y$ , then  $x$  and  $y$  vary..... with each other.
  - (b) If  $xy=20$ , then  $x$  and  $y$  vary .....with each other.
  - (c) When speed remains constant then distance travelled is ..... proportional to time.
  - (d) An auto rickshaw takes 3 hours to cover a distance of 36 km. If its speed is increased by 3km/hour then time taken by it to cover same distance is .....

<b>Subject: Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 14 (Factorization) Work Sheet – 14</b>
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Skill/ Competency/Concept	Target Learning Outcomes	Suggested Strategies
<ul style="list-style-type: none"> <li>• Factorization</li> <li>• Taking common factors</li> <li>• Algebraic identities</li> <li>• Use of algebraic identities in factorization</li> </ul>	<ul style="list-style-type: none"> <li>• Differentiates between expansion and factorization</li> <li>• Understands the factors</li> <li>• Understands the suitable identity</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Mathematics lab activities</li> </ul>

Sample Activity - 1

TLO: To write the factors of the expression
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SHAPE	AREA	POSSIBLE DIMENSIONS	
	$25xy$	Length=.....	Breadth=.....
	$\frac{1}{2}x^2z$	Base = .....	Altitude=.....
	$16x^2y^2$	Side = .....	Side = .....
	$32z^2y^2$	Base = .....	Altitude=.....
	$25\pi x^2$	Radius = .....	Radius = .....

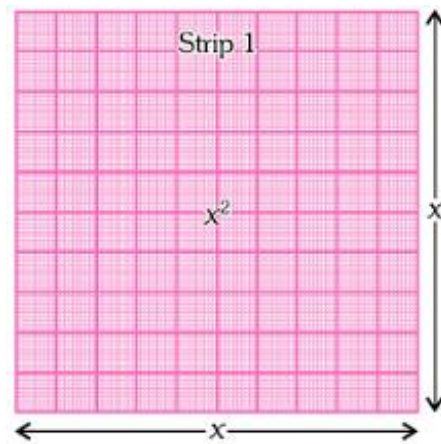
1. Students may be asked to fill up all possible values of dimensions.

### Sample Activity - 2

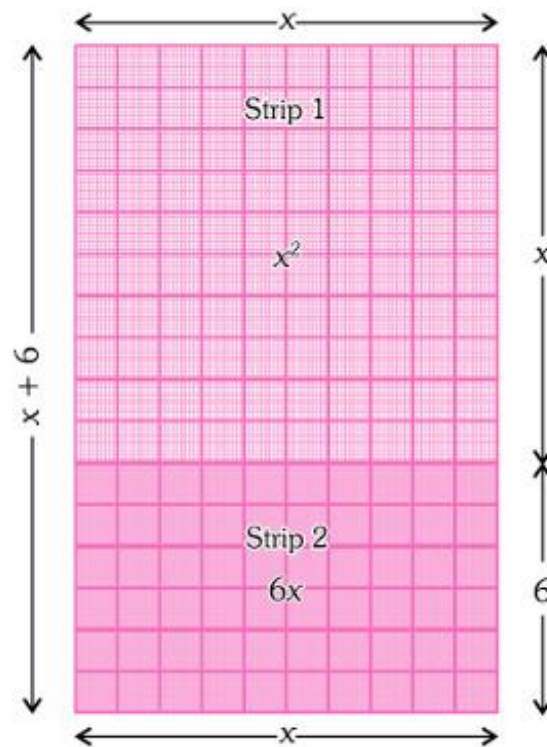
TLO: To factorise  $x^2 + bx + c$  using splitting the middle

To factorise  $x^2 + 11x + 30$  using splitting the middle term by activity method.

- Find two numbers whose product is equal to 30 and whose sum is equal to 11.
- The required number is 5 and 6.
- Hence  $x^2 + 11x + 30$  can be rewritten as  $x^2 + 5x + 6x + 30$
- Cut a square piece from the graph sheet say of size 10 squares by 10 squares. Let us suppose 10 represent the variable  $x$ . Hence area of this square piece of graph paper is  $x^2$ .
- Colour this piece with pink (strip 1). Paste this piece on the chart sheet.

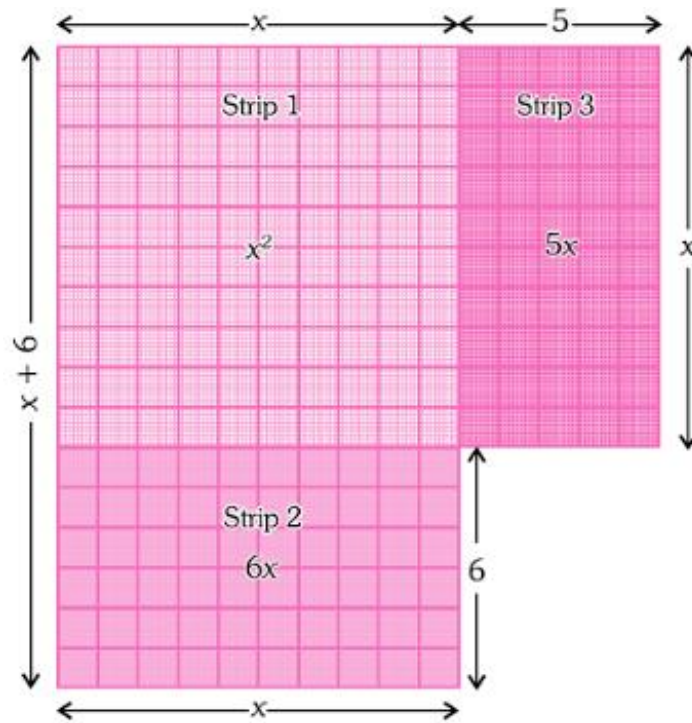


- Cut a rectangle strip of sides  $x = 10$  squares and 6 squares from graph paper. Colour this strip with dark pink (strip 2). Paste this strip on the chart sheet as shown in below figure. Area of this strip =  $6x$

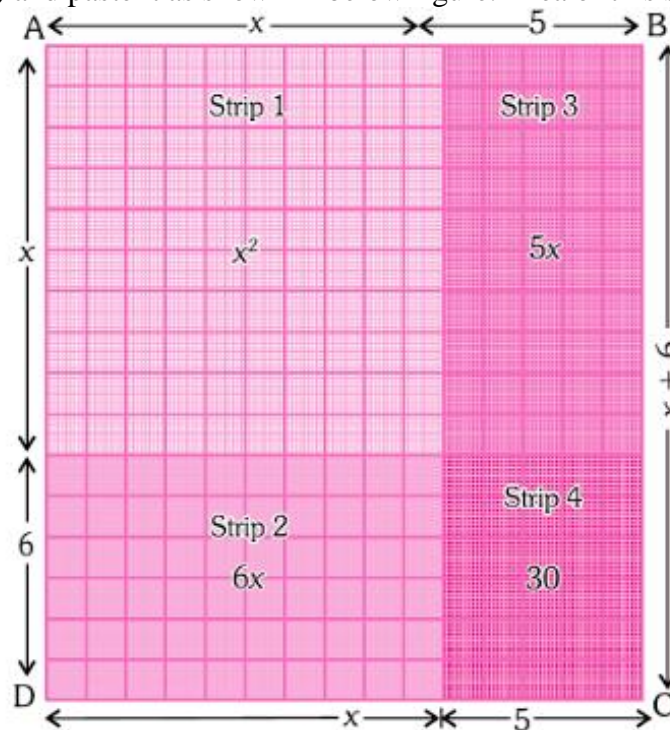


- Cut another rectangle strip of sides  $x = 10$  squares and 5 squares from graph paper. Colour this strip with dark pink (strip 3). Paste this strip on the chart sheet as shown in below figure. Area of this strip =  $5x$





- Now cut one more rectangular strip of sides 5 squares and 6 squares. Colour this strip with red (strip 4) and paste it as shown in below figure. Area of this strip =  $5 \times 6 = 30$ .



- Ask student to observe.
- We obtain a rectangle whose sides are  $x + 6$  and  $x + 5$ . Name this rectangle as ABCD  
 $(x + 6)(x + 5) = \text{Area of the rectangle ABCD} = \text{Sum of all area of all rectangles}$   
 $= x^2 + 6x + 5x + 30 = x^2 + 11x + 30$

Thus factors of  $x^2 + 11x + 30$  are  $(x + 6)$  and  $(x + 5)$

### Suggested Activities

- To factorise  $x^2 + 5x + 6$  using splitting the middle term by activity method.
- Ask students to complete the following table with suitable figure. One is done for the students.

Expression ( $x^2 + bx + c$ )	Factorised form ( $x + m$ )( $x + n$ )	$c = m \times n$	$b = m + n$
$x^2 + 8x + 15$	$(x + 3)(x + 5)$	15	8
$x^2 + 7x + 12$	$(x + 3)(x + 4)$	<input type="text"/>	<input type="text"/>
$x^2 - 11x + 30$	<input type="text"/> <input type="text"/>	<input type="text"/>	<input type="text"/>
$x^2 + 6x + 8$	<input type="text"/> <input type="text"/>	<input type="text"/>	6
<input type="text"/>	$(x - 2)(x - 4)$	8	<input type="text"/>
<input type="text"/>	<input type="text"/> <input type="text"/>	-7	6
$x^2 - 30x + 216$	<input type="text"/> <input type="text"/>	<input type="text"/>	<input type="text"/>

### Learning Assessment:

- Find the greatest common factors of the monomials :  $14x^2y^2, 21x^2y^2, 35x^4y^5z$
- Factorize :  $3x^2y - 6xy^2$
- Factorize :  $(x+y)(2x+3y) - (x+y)(x+1)$
- Factorize the following expressions using suitable identity:
  - $25x^2 - 64y^2$
  - $100 - 9x^2$
  - $5x^2 - 7y^2$
  - $(3x + 5y)^2 - 4z^2$
  - $150 - 6x^2$
- Factorize the following expressions:
 

<ol style="list-style-type: none"> <li><math>x^2 + 11x + 30</math></li> <li><math>x^2 + 18x + 32</math></li> <li><math>x^2 + 7x - 18</math></li> <li><math>x^2 + 5x - 6</math></li> <li><math>y^2 - 4y + 3</math></li> </ol>	<ol style="list-style-type: none"> <li><math>x^2 + 9x + 18</math></li> <li><math>x^2 + 5x - 24</math></li> <li><math>x^2 - 4x - 21</math></li> <li><math>x^2 - 21x + 108</math></li> <li><math>x^2 - 11x - 80</math></li> </ol>
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<b>Subject:</b> <b>Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 15(Introduction To Graphs)</b> <b>Work Sheet – 15</b>
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Skill/ Competency/Concept	Target Learning Outcomes	Suggested Strategies
<ul style="list-style-type: none"> <li>• Drawing of graph</li> <li>• Drawing conclusion from graph</li> <li>• Plotting the given points</li> <li>• Construction of graph</li> </ul>	<ul style="list-style-type: none"> <li>• Identifies different graphs</li> <li>• Understands the information from the graph</li> <li>• Represents the data on the graph</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Demonstration</li> <li>• Mathematics lab activities</li> </ul>

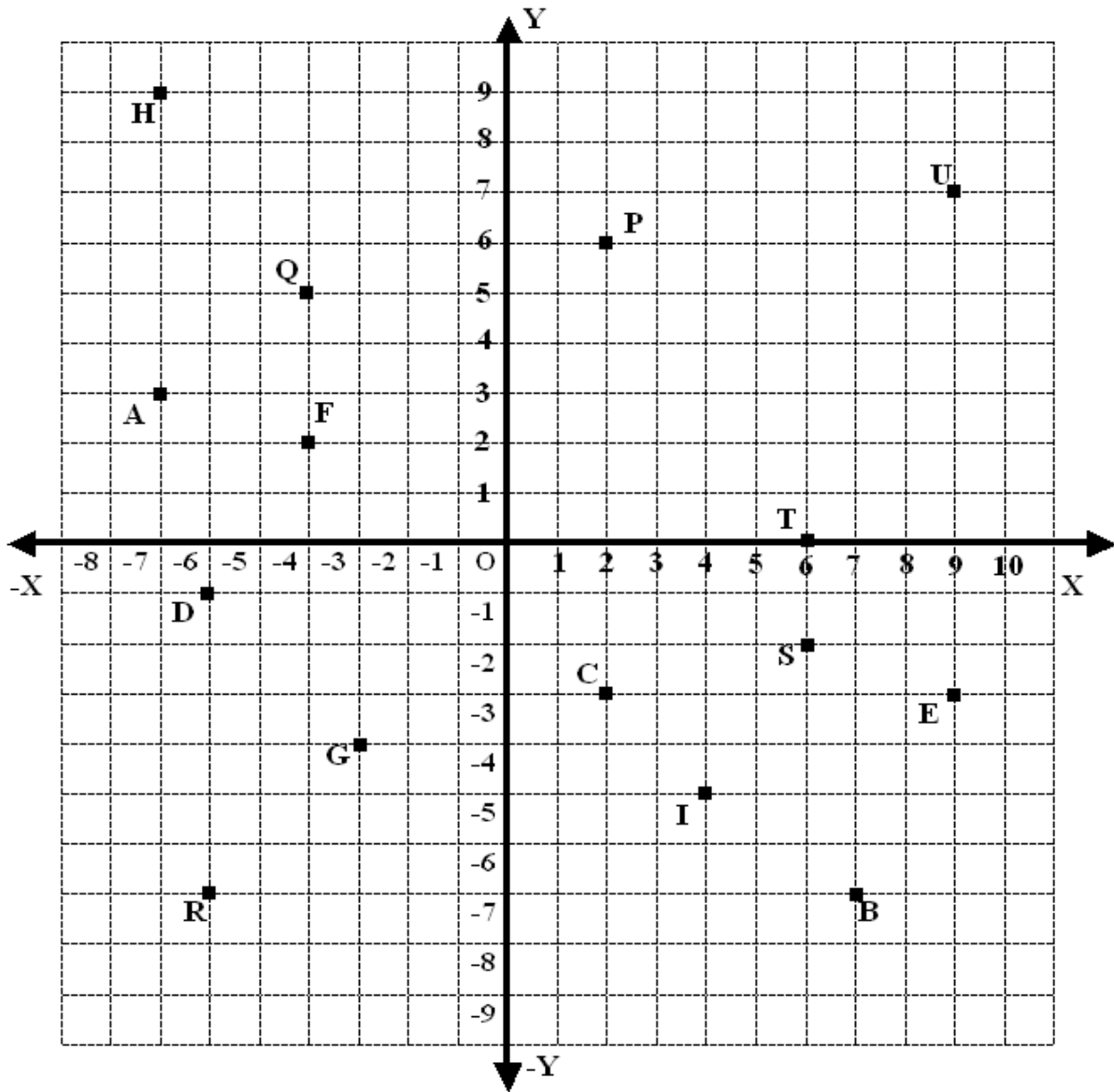
Sample Activity

TLO: To identify and write the coordinates of points from the graph.

To identify and write the coordinates of point from the graph.

Ask student to identify the coordinates of the points from the given graph, then complete the below table:

Point	Coordinates
A	
B	
C	
D	
E	
F	
G	
H	
P	
S	
R	
T	
U	
I	
Q	



### Learning Assessment

- (1). Find the distance of the point (6,8) from x-axis.
- (2). Plot the points (5,0),(5,1),(5,8) . Do they lie on a line? What is your observation?
- (3). Following table gives the temperature at 12:00 noon on seven successive days in a city:

Day(November)	1	2	3	4	5	6	7
Temperature (in $^{\circ}$ C)	14	18	14	16	20	15	18

Plot the graph to illustrate this information.

(4). The following table shows the number of patients discharged from hospital with Dengue diagnosis in different years:

Years:	2002	2003	2004	2005	2006
No of patients:	20	25	35	40	15

Represent this information by a graph.

(5) Draw the velocity time graph from the following data:

Time(in hours)	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00
Speed (in km/h)	30	45	60	50	70	50	40	45

<b>Subject: Mathematics</b>	<b>Level: B2</b>	<b>Class: VIII</b>	<b>Lesson: 16 (Playing With Numbers) Work Sheet – 16</b>
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Skill/ Competency/Concept	Target Learning Outcomes	Suggested Strategies
<ul style="list-style-type: none"> <li>• Understanding the divisibility rules.</li> <li>• Comparing and Analysing numbers based on divisibility</li> <li>• Computing and solving with indirect ways</li> <li>• Appreciating the beauty of number</li> <li>• Finding logic and applying on similar cases</li> </ul>	<ul style="list-style-type: none"> <li>• Remembers and learn divisibility rules.</li> <li>• Identifies numbers as odd, even, prime and composite etc.</li> <li>• Applies divisibility rules on numbers.</li> <li>• Represents numbers in interesting ways.</li> <li>• Prepares and solves different number games.</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Group work</li> <li>• ICT,</li> <li>• Flash card activity</li> <li>• Mental Computation</li> </ul>

### Sample Activity

<p>TLO: Remembers and learn divisibility rules. Applies divisibility rules on numbers</p>
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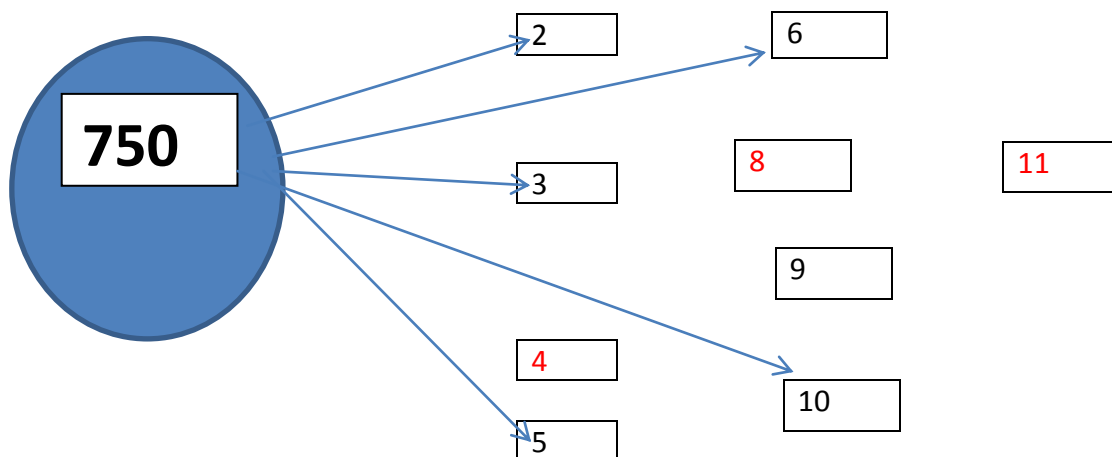
Teacher can involve

whole class in the activity **“Let’s check the Divisibility”** using the tables firstly. Tables up to 11 should be exercised properly.

A number is divisible by	Condition	Example
2	The last digit is even (0, 2, 4, 6, 8).	426 <i>yes</i> 273 <i>no</i>
3	The sum of the digits is divisible by 3.	642 <i>yes</i> ( $6 + 4 + 2 = 12$ , 12 is divisible by 3) 721 <i>no</i> ( $7 + 2 + 1 = 10$ , 10 is not divisible by 3)
4	The last two digits form a number that is divisible by 4.	164 <i>yes</i> (64 is divisible by 4) 135 <i>no</i> (35 is not divisible by 4)
5	The last digit is 0 or 5.	685 <i>yes</i> 432 <i>no</i>
6	The number is divisible by 2 and 3.	324 <i>yes</i> (it is even and $3 + 2 + 4 = 9$ ) 411 <i>no</i> (although divisible by 3, it is not even)
9	The sum of the digits is divisible by 9.	279 <i>yes</i> ( $2 + 7 + 9 = 18$ ) 512 <i>no</i> ( $5 + 1 + 2 = 8$ )
10	The last digit is a 0.	620 <i>yes</i> 238 <i>no</i>

Teacher can play a flash card game in which students are given number cards of 2,3,4,5,6,8,9,10 and 11.

Teacher shows a number and asks the students to check the divisibility with the number on number on number card.



Response of all the students may be recorded and verified by actual division.

### Learning Assessment:

1. Write 'Yes' or 'No' if the number is divisible by the given number.

a) 1620      by 2 ..... by 3..... by 6..... by 9..... By 10.....

b) 42      by 4 ..... by 5..... by 6..... by 7..... By 9.....

- c) 65483 by 2 ..... by 3..... by6..... by 8..... By9.....
- d) 1680 by 5 ..... by 3..... by6..... by 9..... By10.....
- e) 224 by 2 ..... by 4..... by5..... by 9..... By 7.....
- f) 55418 by 2 ..... by 3..... by7..... by 8..... By10.....
- g) 9014 by 5 ..... by 7..... by8..... by 9..... By10.....

2. Check the divisibility of 69546 by 3.

3. Check the divisibility of 12365217 by 9.

4. (a) In the number **235,A11B** replace A and B by digits so that the number is divided exactly by 3 and 5 , try to find the all possible answers.

(b) Replace A and B in the number **2A769B** so that the number is divisible by 3 ,5 and 11.

Show that there are 2 solutions

5. If **28y5** is the multiple of 9,'y' is a digit, what is the value of 'y'?

6. If **42z6** is the multiple of 9, where 'z' is a digit, what might be the values of 'z'?

6. Find the values of letters :

$$\begin{array}{r} 1 \quad 2 \quad A \\ + 6 \quad A \quad B \\ \hline A \quad 0 \quad 9 \end{array}$$

### Test Yourself

1. A person has money to buy 25 bicycles worth Rs 500 each. How many bicycles he will be able to buy if each bicycle is costing Rs 125 more?
2. If 'x' and 'y' vary inversely as each other, and  $x=30$  when  $y = 10$ . Find 'y' when  $x=20$ .
3. A worker is paid Rs 240 for 8 days work. If he works for 25 days how much will he get?
4. Divide:  $(9x^5 + 12x^4 - 6x^2)$  by  $3x^2$
5. Factorize :  $4x^2 + 12x + 5$
6. Factorize :  $36x^2 + 36x + 9$
7. The following table shows the amount of rice grown by a farmer in different years :

Years	2000	2001	2002	2009	2004	2005	2006
-------	------	------	------	------	------	------	------



Rice grown(in quintals)	200	180	240	260	250	200	270
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Plot a graph to illustrate this information.

8. Given that the number  $95a64$  is divisible by 9, where 'a' is a digit, what are the possible values of 'a'.
9. Check the divisibility of 46298 by 2.
10. Check the divisibility of 862565 by 5.