

MATHEMATICS

BACK TO BASICS

ACTIVITIES



NAME: _____

CLASS: VIII (EIGHTH) SECTION : C ROLL NO. _____

SCHOOL: KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD – 32

Subject : Mathematics	Level B1	Class – VIII	Lesson: 1 (Rational Numbers)
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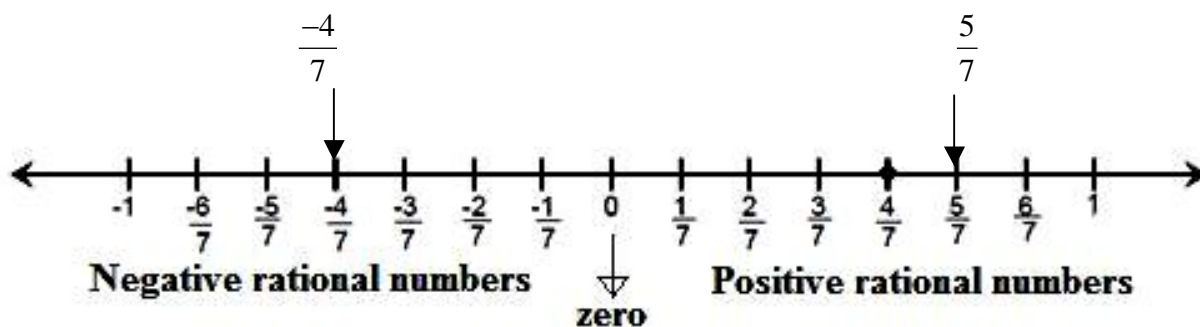
Skill/Competency /Concept	Target Learning Outcomes	Suggested Strategies
<ul style="list-style-type: none"> Understanding and Extending the concept of number family from Natural numbers to rational numbers Forming and Comparing rational numbers Computing with accuracy and verifying Applying to solve daily life problems Representing and referencing 	<ul style="list-style-type: none"> Identifies and compares rational numbers Understands properties of rational numbers Links with daily life and finds suitable condition for applying the concept Applies operations on rational numbers Represents rational numbers on number line Find rational numbers between two rational numbers 	<ul style="list-style-type: none"> Individual Group work ICT, Mathematics lab activities Oral test

Activity – I

TLO: To represent positive and negative rational numbers on a number line

Representation of Rational Numbers on Number line

- For representing $\frac{5}{7}$ and $\frac{-4}{7}$
- Divide seven equal parts between 0 and 1 for $\frac{5}{7}$.
- Divide seven equal parts between 0 and -1 for $\frac{-4}{7}$.
- Count 4 from 0 towards left side to represent $\frac{-4}{7}$.
- Count 5 from 0 towards right side to represent $\frac{5}{7}$.

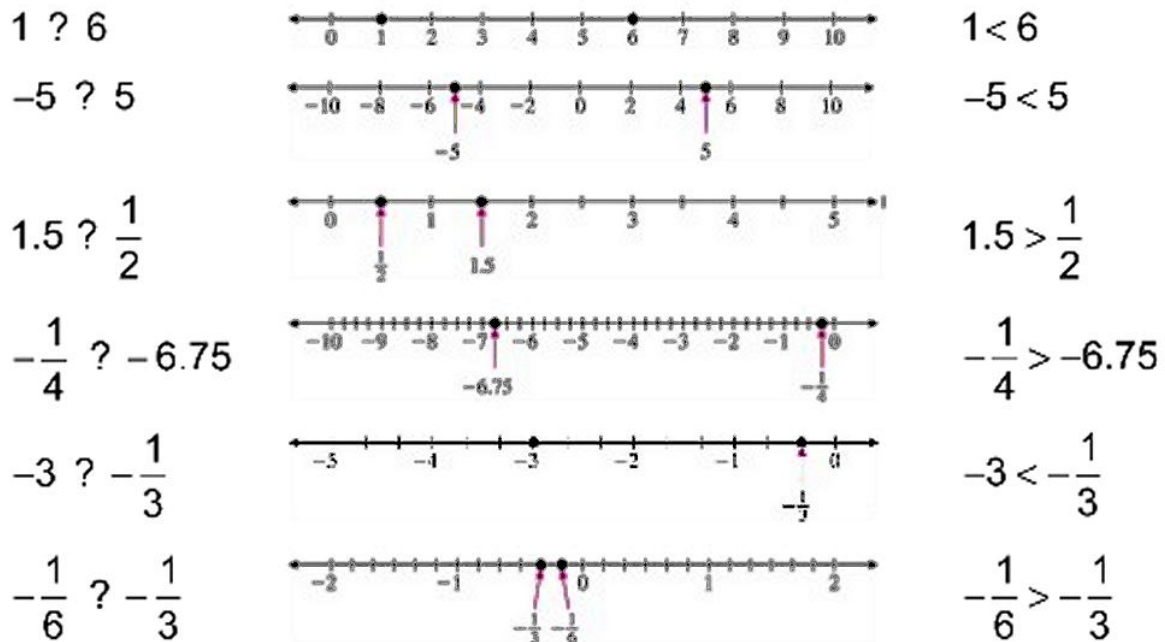


Activity – II

TLO: To compare the rational number using number line.

Comparison of rational number using number line.

- Represent both the rational numbers on the number line.
- The rational number lying on the left is the smaller than the number lying on the right side on the number line.



Activity – III

TLO: Addition and subtraction of Rational numbers using number lines.

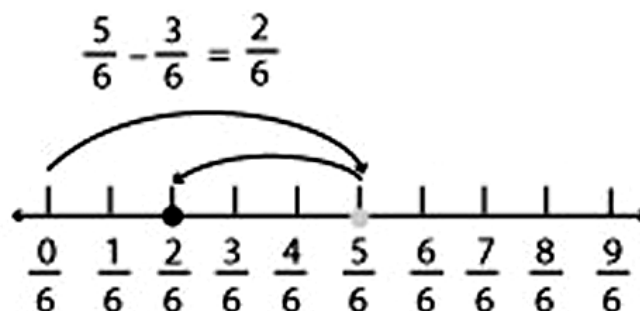
Addition and subtraction of Rational numbers using number lines.

To find the value of $\frac{5}{6} - \frac{1}{2}$.

Convert $\frac{1}{2}$ to $\frac{3}{6}$.

Divide 0 to 1 and 1 to 2 into six equal parts.

Count and jump 5 steps towards right from 0 and then jump 3 steps back (towards 0) i.e. $\frac{2}{6}$



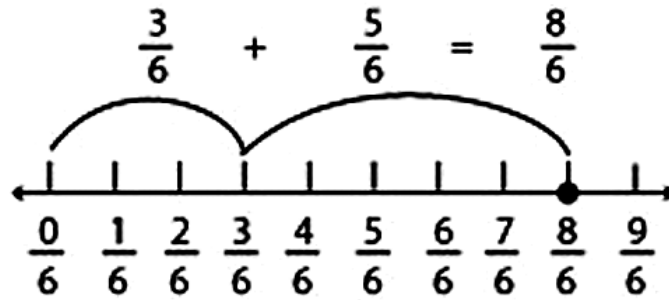
To find the value of $\frac{1}{2} + \frac{5}{6}$.

Convert $\frac{1}{2}$ to $\frac{3}{6}$.

Divide 0 to 1 and 1 to 2 into six equal parts.

Count and jump 3 steps towards right from 0 and then jump 5 steps towards right of 3rd

steps i.e. $\frac{8}{6}$



ACTIVITY PAGE BY STUDENT

Subject : Mathematics	Level B1	Class – VIII	Lesson: 2 (Linear Equations in one variable)
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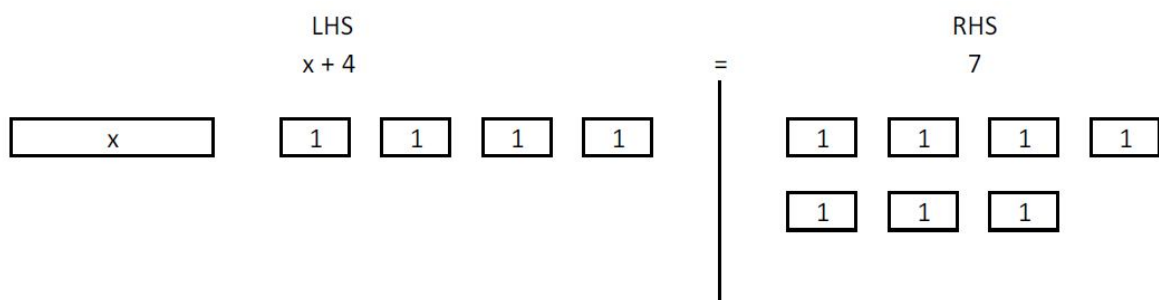
Skill/Competency /Concept	Target Learning Outcomes	Suggested Strategies
<ul style="list-style-type: none"> • Computational Skills • Formation and solution of linear equation • Reducing equation in simpler form • Problem solving 	<ul style="list-style-type: none"> • Understanding the concepts of linear equations in one variable • Framing of linear equation • Solving linear equation having variable in one side as well as on both sides • Solving word problems based on linear equation 	<ul style="list-style-type: none"> • Individual • Group work • ICT, • Mathematics lab activities • Oral test

Activity – I

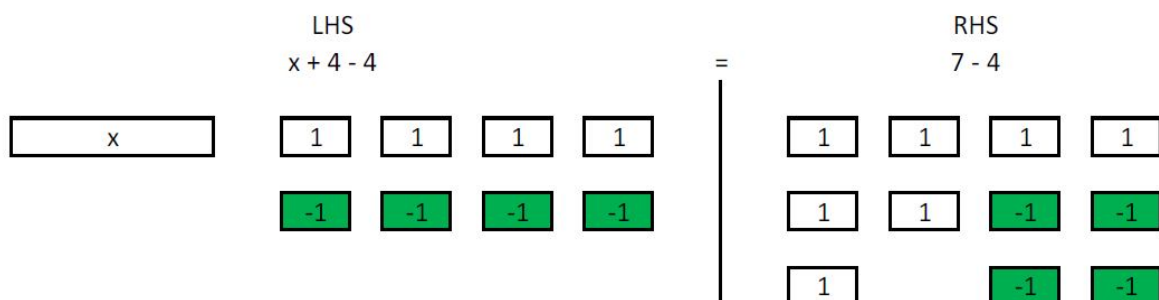
TLO: To solve linear equation in one variable by activity method.

To solve $x + 4 = 7$

- Start by taking one white rectangular piece to represent 'x' and 11 white square pieces to represent constant 4 and 7.
- Create two separate work areas – one for LHS and the other for RHS of the equation. Keep the white rectangle piece and 4 white square pieces on LHS and 7 white square pieces on RHS.



- To remove the constant 4 on LHS, add three green (negative) colour square pieces to both areas. This is equivalent to adding -3 to both sides. This is done to create 0 pairs.



- Remove the 4 zero pairs from each side to obtain the solution $x = 3$.

LHS		=		RHS
x				3
x				1
				1
				1

Activity – II

TLO: Group Activity – Constructing linear equations from Real Situations

This activity will have students construct and solve linear equations that they derive from real world situations.

Group size: 4 people

1. Construct a linear equation in which the solution is the number of apps that you have on your smartphone. (If you do not have a smartphone then your solution should be $a = 0$). The equation should require at least two operations. For example:

$$3(61 - a) = 63 \text{ where } a \text{ represents the number of apps.}$$

2. Pass your paper to the student sitting to your right. That student will solve the equation and verify that the answer is correct.

3. Next, construct another linear equation. The solution to this equation should be the number of movies that you have seen in a theater in the last year. For this equation, be sure to have a variable on each side of the equation. For example:

$$4m - 6 = 2m + 2 \text{ where } m \text{ represent the number of movies.}$$

4. Pass your paper to the student sitting to your left. That student will solve the equation and verify that the answer is correct.

5. Each of you will construct another equation in which the solution is the number of classes that you are taking this semester. This time include fractions in the equation.

For example: $\frac{2}{3}c + 11 = 13$, where c represents the number of classes.

6. Pass your paper to the student sitting across from you, diagonally. That student will solve the equation and verify that the answer is correct.

7. Construct a linear equation whose solution is the price per gallon of gas that you most recently purchased (rounded to the nearest cent). For example:

$$100p - 201 = 188 \text{ where } p \text{ represents price per gallon.}$$

8. Take all four papers and exchange them with another group. Those students will solve the equations and verify that the answers are correct.

Activity – III

TLO: To solve linear equation in one variable trial and error method.

Solve linear equation in one variable trial and error method

Let the equation is $7x + 2 = 51$.

We can try some numbers, adjust them, and see if we manage to hit the right answer.

For example, trying 3 as our x , we get $7 \times 3 + 2 = 23$ and with we get $7 \times 5 + 2 = 37$

As we increase our x it seems that we increase our result, so if we want to get 51 then we will want to try an even higher x .

If we try a considerably higher x such as 8, then we get $7 \times 8 + 2 = 58$, which has passed the mark a little. Coming down to 7, we find that it does the trick, since $7 \times 7 + 2 = 51$. Therefore the required solution is $x = 7$

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ACTIVITY PAGE BY STUDENT

Subject : Mathematics	Level B1	Class – VIII	Lesson: 3 (Understanding Quadrilaterals)
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Skill/Competency /Concept	Target Learning Outcomes	Suggested Strategies
<ul style="list-style-type: none"> • Computation Skills • Drawing Skills • Classification of polygons • Interior and exterior angle sum property of polygons • Various parallelograms and their properties • Problem solving 	<ul style="list-style-type: none"> • Understanding the classification of polygons • Understanding diagonals of polygons • Understanding the angle sum property of quadrilaterals. • Understanding and use of exterior angles sum property of a polygon. • Understanding and use of properties of different types of quadrilaterals based on sides, angles and diagonals. 	<ul style="list-style-type: none"> • Individual • Group work • ICT, • Mathematics lab activities • Oral test

Activity – I

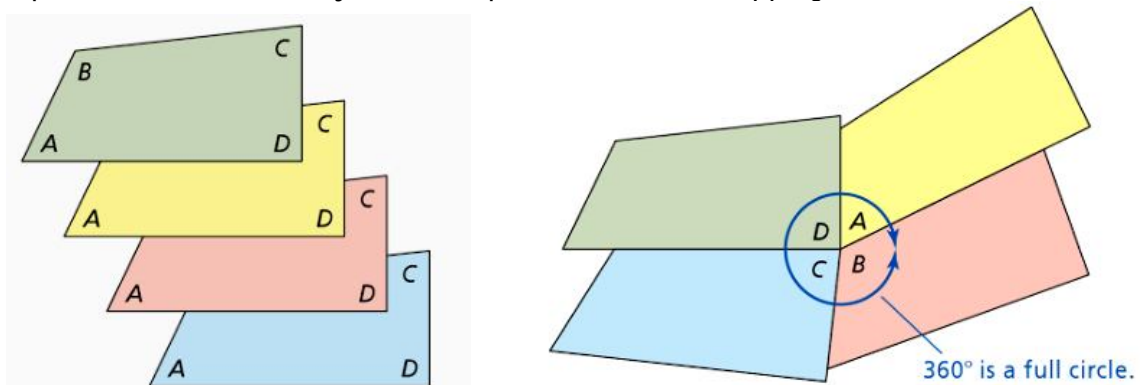
TLO: Angle sum property of a Quadrilateral

To verify the sum of the interior angles of a quadrilateral is 360° 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.



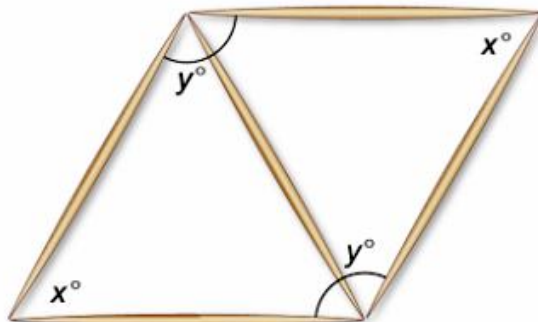
- Ask the student to observe:
Four angles form a _____
Full circle represents angle _____
- Thus, the sum of the interior angles of a quadrilateral is 360°

Activity – II

TLO: Opposite angles of a Parallelogram are equal

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

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



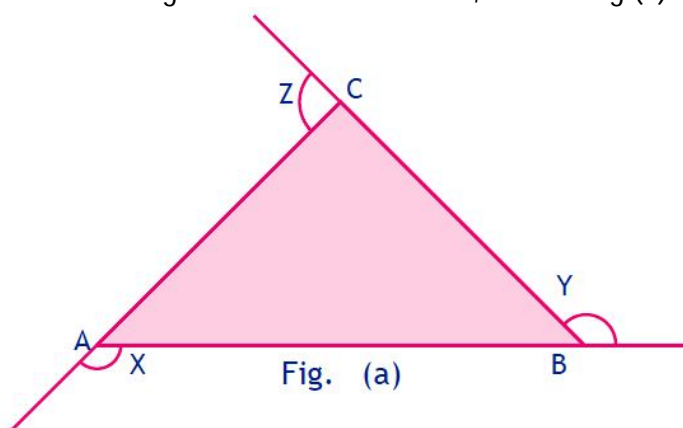
- Find the measures of the two acute angles and two obtuse angles.
- Toothpicks are the same length, therefore each of the triangles is an equilateral triangle. So, x equal to 60° .
- Each of the acute angles of a parallelogram has a measure of 60° . So, y equal to $2 \times 60^\circ = 120^\circ$.
-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

Activity – III

TLO: Sum of the exterior angles drawn in order, of any polygon is 360° .

To verify by paper cutting and pasting, that the sum of the exterior angles drawn in order, of any polygon is 360° .

Step 1.: Draw a triangle on a coloured sheet and name it ABC. Make exterior angles in an order at each vertex of this triangle and name them as X,Y and Z. Fig.(a).



Step 2.

Cut out all the three exterior angles. Paste them on a white sheet of paper at a point P so that there is no gap between them as shown in Fig. (b).

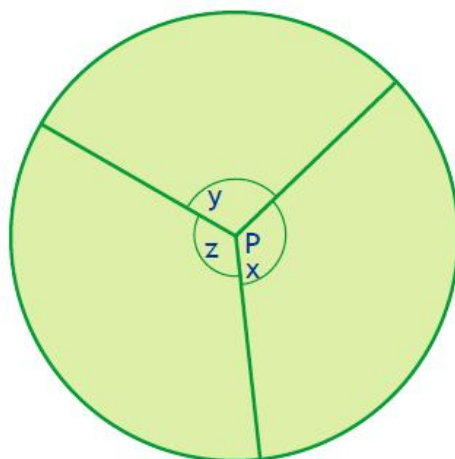


Fig. (b)

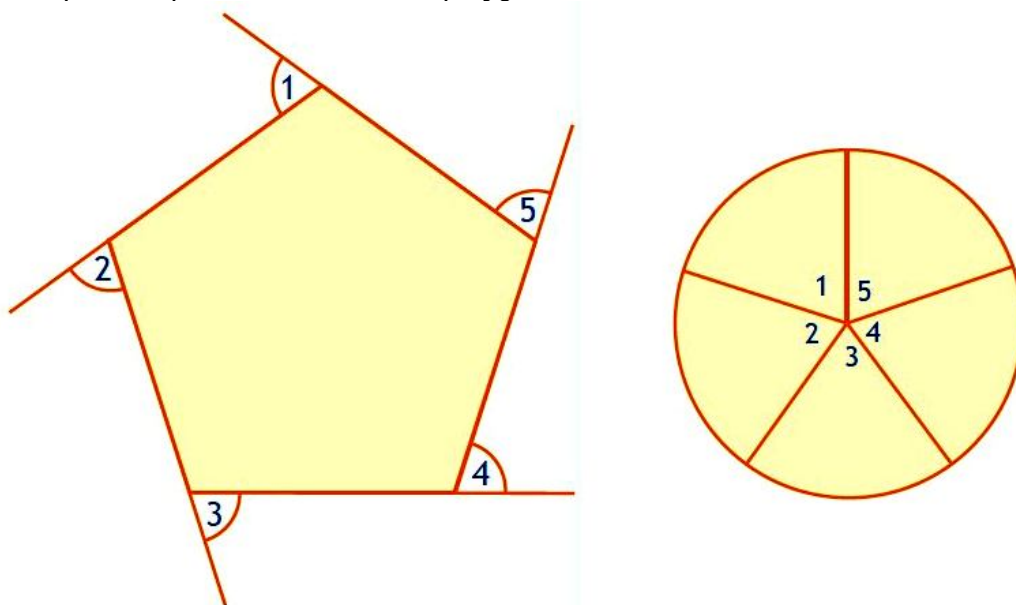
Observation

1. All angles together form a angle (straight, reflex, complete)
2. The sum of exterior angles of a triangle taken in order is.....

(b) For polygons

Step 4 : Draw a quadrilateral, a pentagon and a hexagon on a coloured sheet of paper. Mark their exterior angles taken in order at each vertex.

Step 5 : Repeat Step 2 for each of these polygons.



Observations :

1. The sum of exterior angles of a quadrilateral taken in an order is
2. The sum of exterior angles of a pentagon taken in an order is
3. The sum of exterior angles of a hexagon taken in an order is
4. The sum of exterior angles in each polygon taken in an order is

ACTIVITY PAGE BY STUDENT

Subject : Mathematics	Level B1	Class – VIII	Lesson: 4 (Practical Geometry)
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Skill/Competency /Concept	Target Learning Outcomes	Suggested Strategies
<ul style="list-style-type: none"> • Extending the concept of construction from line to Quadrilateral • Developing relationship between vertices and edges • Drawing, comparing and constructing skills • Analyzing and applying appropriate criterion 	<ul style="list-style-type: none"> • Extends construction from basics to quadrilaterals • Identifies different parts and types of quadrilaterals • Applies suitable construction criterion • Links with acquired skill • Analyses and finds own way of constructing special quadrilateral 	<ul style="list-style-type: none"> • Individual • Group work • Geoboard activity • Demonstration • Mathematics lab activities

ACTIVITY – I

To Construct Quadrilateral JUMP with $JU = 3.5$ cm, $UM = 4$ cm, $MP = 5$ cm, $PJ = 4.5$ cm and $PU = 6.5$ cm

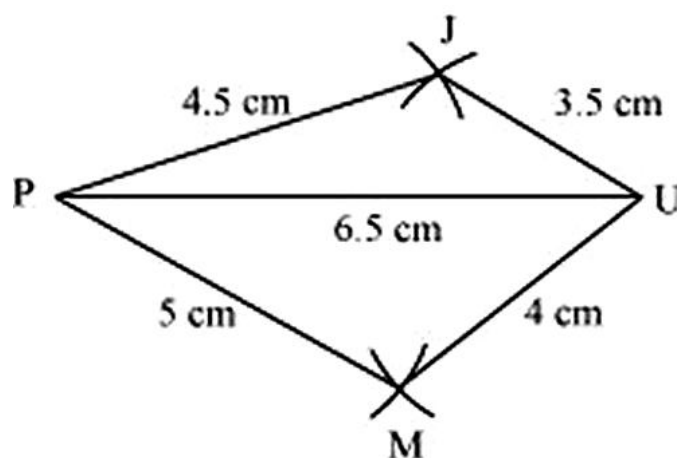
Steps:

(1) ΔJUP can be constructed by using the given measurements as follows.

(2) Vertex M is 5 cm away from vertex P and 4 cm away from vertex U. Taking P and U as centres, draw arcs of radii 5 cm and 4 cm respectively. Let the point of intersection be M.

(3) Join M to P and U.

JUMP is the required quadrilateral.

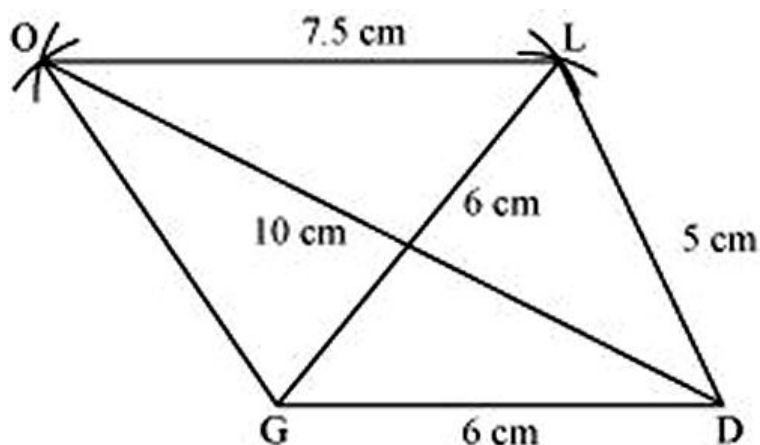


ACTIVITY – II

To Construct Quadrilateral GOLD with $OL = 7.5$ cm, $GL = 6$ cm, $GD = 6$ cm, $LD = 5$ cm and $OD = 10$ cm

Steps:

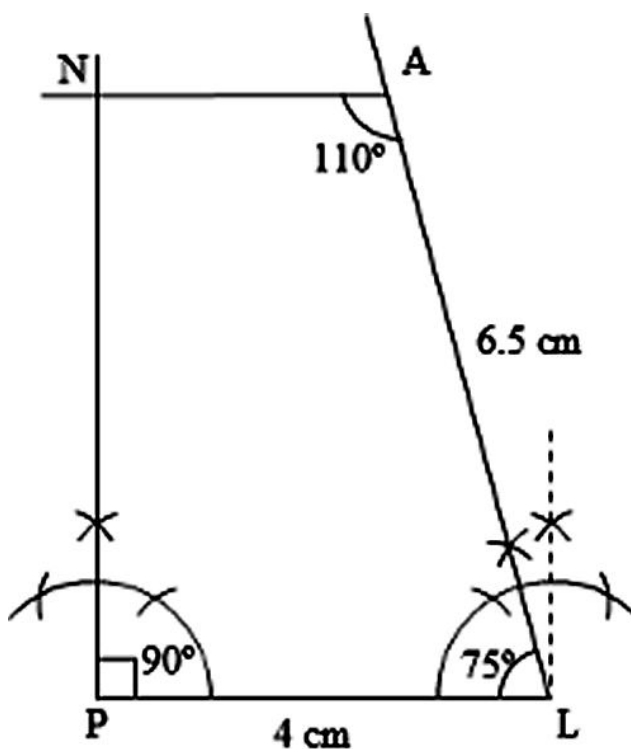
- (1) ΔGDL can be constructed by using the given measurements as follows.
 - (2) Vertex O is 10 cm away from vertex D and 7.5 cm away from vertex L. Therefore, while taking D and L as centres, draw arcs of 10 cm radius and 7.5 cm radius respectively. These will intersect each other at point O.
 - (3) Join O to G and L.
- GOLD is the required quadrilateral.



ACTIVITY – III

To Construct Quadrilateral PLAN with $PL = 4 \text{ cm}$, $LA = 6.5 \text{ cm}$, $P = 90^\circ$, $A = 110^\circ$, $N = 85^\circ$

Steps:



(1) The sum of the angles of a quadrilateral is 360° .

In quadrilateral PLAN, $\angle P + \angle L + \angle A + \angle N = 360^\circ$

$$\Rightarrow 90^\circ + \angle L + 110^\circ + 85^\circ = 360^\circ \quad \Rightarrow 285^\circ + \angle L = 360^\circ \quad \Rightarrow \angle L = 360^\circ - 285^\circ = 75^\circ$$

(2) Draw a line segment PL of 4 cm and draw an angle of 75° at point L. As vertex A is 6.5 cm away from vertex L, cut a line segment LA of 6.5 cm from this ray.

(3) Again draw an angle of 110° at point A.

(4) Draw an angle of 90° at point P. This ray will meet the previously drawn ray from A at point N.

PLAN is the required quadrilateral.

ACTIVITY – IV

To Construct Quadrilateral TRUE with $TR = 3.5$ cm, $RU = 3$ cm, $UE = 4$ cm, $R = 75^\circ$ and $U = 120^\circ$

Steps:

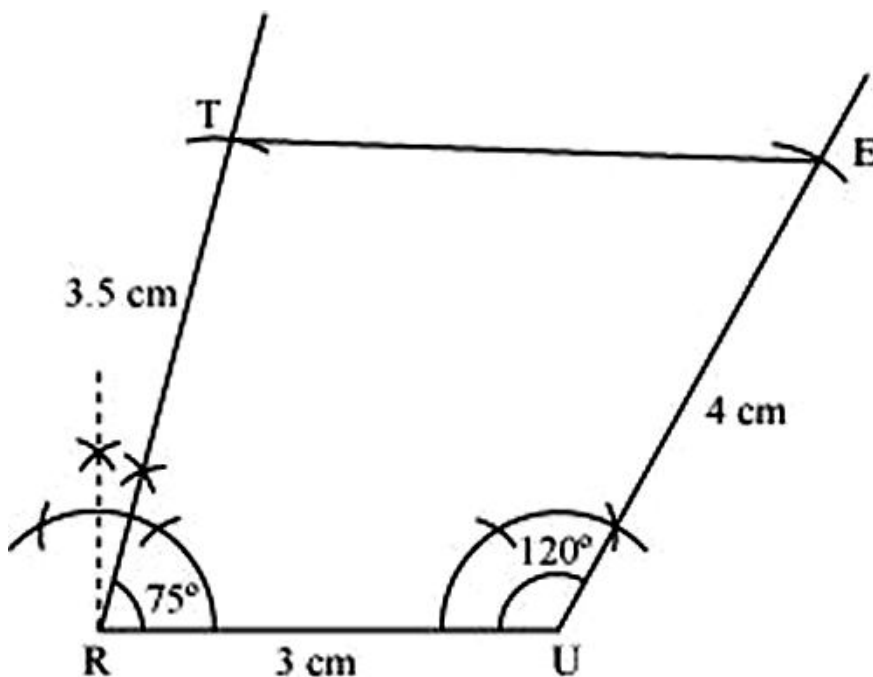
(1) Draw a line segment RU of 3 cm and an angle of 120° at point U. As vertex E is 4 cm away from vertex U, cut a line segment UE of 4 cm

from this ray.

(2) Next, draw an angle of 75° at point R. As vertex T is 3.5 cm away from vertex R, cut a line segment RT of 3.5 cm from this ray.

(3) Join T to E.

TRUE is the required quadrilateral.



ACTIVITY PAGE BY STUDENT

Subject : Mathematics	Level B1	Class – VIII	Lesson: 5 (Data Handling)
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Skill/Competency /Concept	Target Learning Outcomes	Suggested Strategies
<ul style="list-style-type: none"> Organizing data Analyzing data Skill of pictorial representation Drawing conclusion 	<ul style="list-style-type: none"> Knowing about data Understanding distribution table, bar graph, pie chart Differentiating bar graph and histogram Application of probability 	<ul style="list-style-type: none"> Individual Group work ICT, Mathematics lab activities Oral test

Activity – I

TLO: Understanding distribution table and bar graph

(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

Activity – II

TLO: Understanding distribution table and pie chart

(1) Collect information from your class about which sport 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 and then draw pie chart

Activity – III

TLO: Understanding the drawing of pie chart

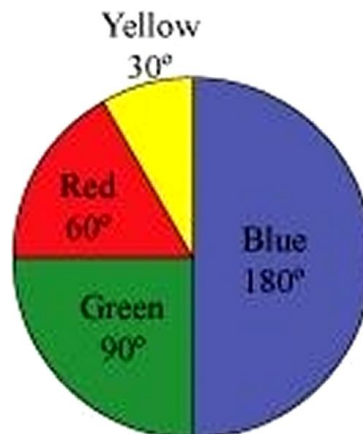
To draw a pie chart showing the following information. The table shows the colours preferred by a group of people.

Colours	Number of people
Blue	18
Green	9
Red	6
Yellow	3
Total	36

The central angle for each colour can be calculated as follows.

Colours	Number of people	In fraction	Central angle
Blue	18	$\frac{18}{36}$	$\frac{18}{36} \times 360^\circ = 180^\circ$
Green	9	$\frac{9}{36}$	$\frac{9}{36} \times 360^\circ = 90^\circ$
Red	6	$\frac{6}{36}$	$\frac{6}{36} \times 360^\circ = 60^\circ$
Yellow	3	$\frac{3}{36}$	$\frac{3}{36} \times 360^\circ = 30^\circ$

The pie chart of the above data is as follows.



ACTIVITY PAGE BY STUDENT

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

Activity – I

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.

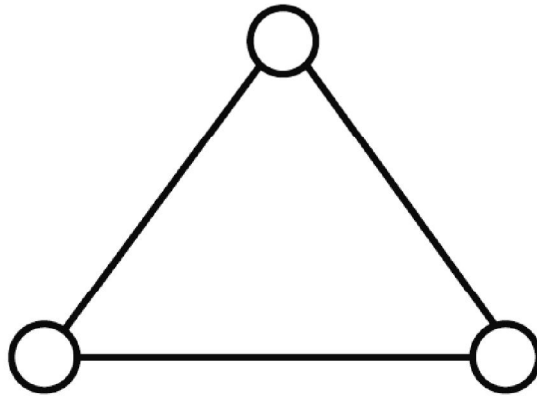
(A magic square is a square with numbers arranged so that the sum of the numbers in each row, column and diagonal is the same)

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

Activity – II

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.



Activity – III

Observe the following pattern and generate it further:

9^2	=	81
99^2	=	9801
999^2	=	998001
999^2	=	99980001
?	=	?
?	=	?
?	=	?

Activity – IV

Observe the following pattern and generate it further:

$10^2 - 10^1 + 1$	=	91
$10^4 - 10^2 + 1$	=	9901
$10^6 - 10^3 + 1$	=	999001
$10^8 - 10^4 + 1$	=	99990001
?	=	?
?	=	?
?	=	?

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ACTIVITY PAGE BY STUDENT

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

Activity – I

TLO: Use of Cubes and Cube Roots

With the cubes, build the next smallest cube block. The length of each of the sides of the block should measure 3 units. To find the volume of the tower, count the number of small cubes used to build the block. How many tiles did you need to build this block?

Activity – II

Observe the following pattern and generate it further:

1^3	=	1
2^3	=	$3 + 5$
3^3	=	$7 + 9 + 11$
4^3	=	$13 + 15 + 17 + 19$
?	=	?
?	=	?
?	=	?

Activity – III

Observe the following pattern and generate it further:

1^3	=	1
$2^3 - 1^3$	=	7
$3^3 - 2^3$	=	19
$4^3 - 3^3$	=	37
$5^3 - 4^3$	=	61
?	=	?
?	=	?
?	=	?

ACTIVITY PAGE BY STUDENT

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

Activity – I

TLO: Understanding Ratio and Percentage

To collect the marks of all the students of Class VIII Periodic test in Mathematics subject and find the ratio of the students scored 50% more to 50% below marks.

Activity – II

TLO: Understanding Increase or Decrease Percent

Collect the salary of your parent drawn in last year July 2016 and this year July 2017. Find the increase % in the salary.

Activity – III

TLO: Understanding and use of VAT

Find the total buying price for the following items when 5% VAT is added on the purchase of
 (a) Three notebook at Rs 50 (b) Five bars of soap at Rs 55 each (c) 5 kg of flour at Rs 25 per kg (d) 10 kg of sugar at Rs. 40

Activity – IV

TLO: Understanding the relation between Simple Interest and Compound Interest

Compare the Simple Interest and Compound Interest for the Principal amount Rs. 10000 for 1 to 10 years.

Years	Simple Interest	Compound Interest
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		



ACTIVITY PAGE BY STUDENT