MATHEMATICS THROUGH ACTIVITY

Supplementary Work Book

Class - VII

MATHEMATICS THROUGH ACTIVITY

For Class - VII

(Supplementary Book)

(English Translation of Kajer Madhyame Ganit)

1. Name : ....

2. Mother's Name : ....

3. Father's Name : ....

4. Name of the School : ....

5. Name of the Village/City : ....

6. Name of the District : ....

<u>PREFACE</u>

Some important perspectives regarding teaching learning in school level are published in National Curriculum Framework (2005). It has been Mentioned that for all - round development of child (a) Daily experience of child should be connected with the knowledge acquired from school. (b) Tendency to mere memorisation should be discouraged. (c) It should be carefully noticed that teaching learning shouldn't be text book oriented only. (d) Evaluation system should be flexible and connected to daily classroom-teaching. (e) Democratic environment should be created in classroom for all round development of each child.

It has been directed in the new time-table of West Bengal Board of Secondary Education to arrange peer-learning and remedial lesson in Mathematics and other subjects once in a week and to set up Mathematics laboratory. Its main objective is to learn through activity and to overcome the weakness in Mathematics. In this context, State Council of Educational Research and Training arranged a number of seminars in concerned subjects. Board members and teachers from Schools approved by Board were present in those seminars. The work-sheet obtained from those seminars had been applied in classroom teaching in some selected schools through District Institution for Education and Training (DIET).

After performing the experimental application, some of the opinions obtained from the teachers are as follows :

● To learn Mathematics through activity is encouraging and acceptable.

● This type of teaching learning method is interesting to teachers and learners.

● Application of this method will make the learners attentive and enthusiastic in learning.

● Learners have shown their interests in the application of Mathematics through activity and the lessons delivered were all practical. This method of teaching will make the learners more interested in Mathematics learning.

The teachers of Secondary Schools were invited to make work-sheet (suitable for class VI/VII/VIII) for learning Mathematics through activity in the wokshops arranged by DIET and SCERT(WB).

It has been noticed that teachers are very much interested in this type of work and many of them submitted work-sheet to us. State Council of Educational Research and Training (WB) is grateful to all of them.

At first, Sri Subrata Biswas and Sri Gautam Bhattacharya, officers of this Council verified the acceptability of all the work sheets collected and helped in editing of this supplementary book.

This supplementary book is published for each learner, centering the concept of Mathematics Laboratory of class VI/VII/VIII in the 11th five-year-plan of Sarvasiksha Abhijan with objective in qualitative improvement of teaching learning in upper primary level. It is expected that, in due course of time the students will get this book in sufficient number from the office of the District Project Officer. Teachers and learners will be able to further develop new work-sheet taking cue from those already made. So it is expected that more and more new ideas will evolve from the work sheet published in this book.

We shall be more enriched if we get opinions and suggestions from teachers, learners and people interested about this supplementary book.

Prof. Rathindranath De
Director
State Council of Educational Research & Training (W. B.)

List of the articles needed to perform the activity in each of the work-sheet of this supplementary book is as follows :

a) White and coloured paper, piece-board.

b) Scissors.

c) Adhesive, Cellotape.

d) Sketch-pen, Pencil.

e) Scale.

f) Larger plastic water-bottle.

g) Thickneedle, Thread.

h) Pen-refill of big and small cross-section.

i) Candles.

j) Water and water-mug.

k) Watch, Stopwatch.

l) Rubber-band.

m) Battery-set toy-train.

n) Disc of different colours

o) Plate.

p) Protractor.

q) Compass.

r) Stick or wire

s) Chalk.

t) Nails.

Name of the activity

	Name of Activity	**Page**

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 1 : Determination of total area of two paths along the length and breadth of a rectangular garden.

Material : Paper, Scissors, Adhesive

Description of the Activity	Your Comments
1) Take a rectangular paper of length 'x' unit and breadth 'y' unit (x > y) 2) Take a rectangular paper PQRS having length 'x' unit and breadth 'a' unit (a < y) and another rectangular paper MNOT having length 'y' unit and breadth 'a' unit. Then mark them with pen like the following figures. 3) Paste the above two rectangular papers on the large rectangular paper like the following figure.	
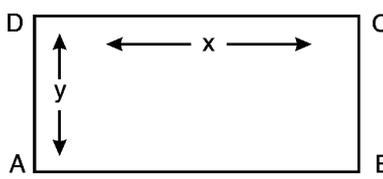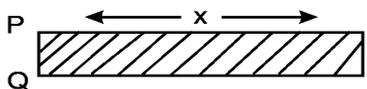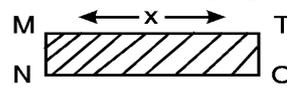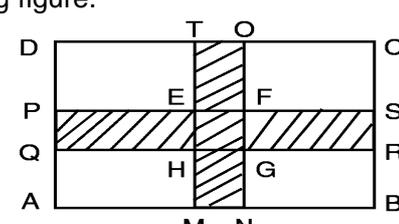
Questions : 1) How many and what type of geometrical figures are formed in the line - shaded part ?

2) How many times the geometrical figure EFGH has appeared ?

3) What is the total area of the geometrical figures formed in the line-shaded part ?

4) What is the total area of the two paths ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Date.........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Activity – 2 : Delermination of area and perimeter of the path of uniform width surrounding a square garden.

Material : Coloured paper, scissores, Adhesive.

Description of the activity	Your Comments
1) Take one piece of red coloured square paper of side 'a' unit. ← a → 1	
2) Take 4 blue coloured square papers of side 'b' unit (b<a) ←b→ ←b→ ←b→ ←b→ 2 3 4 5	
3) Take 4 rectangular yellow coloured papers of length 'a' unit and breadth 'b' unit. b ← a → b ← a → b ← a → b ← a → 6 7 8 9	
4) Make a larger square figure with the pieces of coloured papers, as shown. 2 | 9 | 3 8 | 1 | 6 5 | 7 | 4	
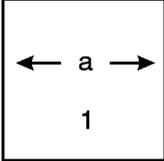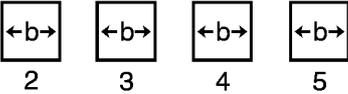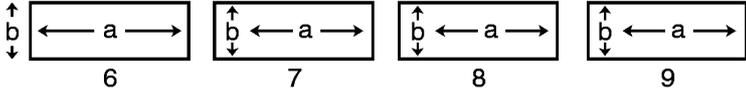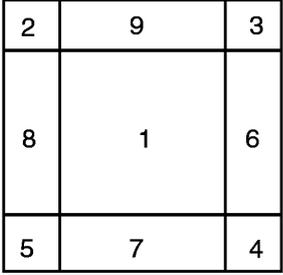
Questions :
1) Mention the squares and rectangles making the path around the square no 1.
2) What are the areas of each of the squares and rectangles ?
3) What are the perimeters of each of the squares and rectangles ?
4) What is the total area of the path surrounding the square no.1?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 3 : Determination of square-root of fraction (where both the numerator and the denominator are perfect square.)

Sub-unit : To determine the simplest value of

Material : Paper, sketch Pen, scissors, scale $\sqrt{\dfrac{25}{64}}$.

Date........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a square piece from a graph-sheet having 64 unit squares. 2) Out of 64 pieces colour 25 pieces with red shade. 3) Arrange these 25 squares in a square shape. 4) Set the rest white squares on both sides of the above red squares in such a way that a larger square will be formed.	
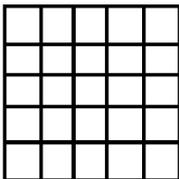
Questions :

1) What is the length of the side of the square made by 25 square pieces.

2) What is the square root of 25 ?

3) What is the length of the side of the larger square ?

4) What is the square root of 64 ?

5) What is the value of the square root of $\dfrac{25}{64}$ in decimal fraction ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 4 : Problem regarding time and work.

Material : A plastic water bottle of 2 litre capacity, thick needle, Pen-refill having larger and narrow cross-section, candle, blade, water, water-mug, watch, scale and Rubber band.

Description of the activity	Your Comments
1) Make two holes at the same height in the lower portion of the bottle and enter two refillh througl them. Use wax to fit the rubber band refills perfectly.	
2) Fit the scale on the bottle with the rubber band.	
3) Close the open ends of the refills and fill the bottle with water upto the level A.	
4) Open the refill-1, note the time till water level reaches B.	
5) Close the refill-1 and fill the bottle upto A again. Now open the refill-2 and note the time in similar manner.	
6) Again fill the bottle upto level A with water and open two refills together. Note the time till water level reaches level B	
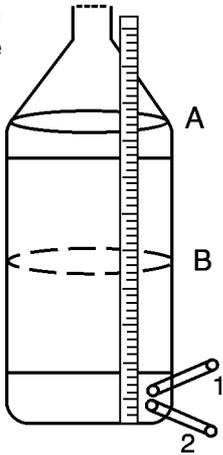
Questions : 1) Are the times noted in (5) and (6) are same ?

2) Note the time till the water level reaches the holes and discuss about the result.

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

(4)

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 5 : Problem regarding Time and distance.

Material : A battery set Toy-train, stop-watch, Refill, Cellotape.

Date..........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Stick the refill in front of the Toy train by cellotape as shown in the figure. 2) Observe the times taken for three or four different distances coverd by the train. 	
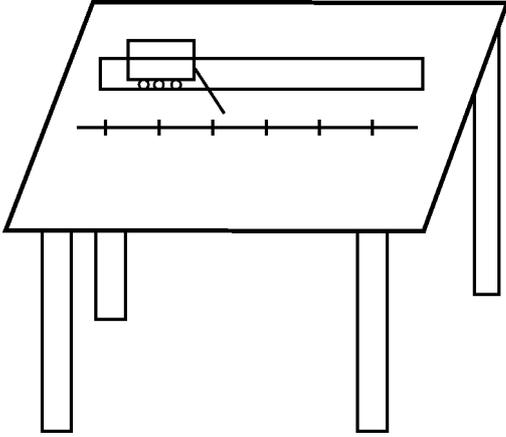
Questions : 1) Mention What is the relation between the distanceand time ?

N. B. - Time and distance regarding crossing the lamp-post (or the bridge beside the railline) may be determined in the same manner.

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 6 : Product of Polynomials : (ax+by)(cx+dy)

Sub-unit : Verification of the product of $(2x+y)(x+3y)= 2x^2+7xy+2y^2$

Material : Paper, Scissors, Scale.

Date.........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take two square papers having side 'x' unit and six square papers of side 'y' unit. 2 pc. (side x) 6 pc. (side y) 2) Take seven rectangular papers of length 'x' unit and breadth 'y' unit. 7 pc. (x by y) 3) Make a larger rectangle with the above papers. x^2, x^2, xy / xy, xy, y / xy, xy, y / xy, xy, y	

Questions : 1) What is the area of the larger paper ?

2) What is the collective area of all the small papers?

3) What is the relation between 'the area of the large paper' and 'the collective area of the small pieces ?

4) $(2x + y) (x + 3y) = $?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 7 : Product of Polynomials. (ax+by)(cx+dy).

Sub-unit : Determination of the product of (2x+y)(x+3y).

Material : Paper, Scale, Scissors.

Date.........................

Name of the School..

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Select double unit of 'x' and single unit of 'y' along the horiontal edge of a rectangular paper in succession.	
2) Select single unit of 'x' and tripple unit of 'y' along the vertical edge of the rectangular paper in succession.	
3) Divide the rectangular paper with your pen, into as many squares and rectangles as possible, as shown in the figure.	

Figure (step 1): $x \mid x \mid y$

Figure (step 2): x, y, y, y

Figure (step 3):

	x	x	y
x	x^2	x^2	xy
y	xy	xy	y^2
y	xy	xy	y^2
y	xy	xy	y^2

Questions : 1) What is the area of the large rectangular paper ?

2) What is the collective area of all the small pieces ?

3) Write the product of (2x+y) (x+3y).

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

(7)

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity –8 : Product of Polynomials

Sub unit : Determination of the product. $(2x+3y)(x+2y)$

Material : Paper, Sketch pen, Scissors.

Date..........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a rectangular piece of paper with length $(2x+3y)$ units and width $(x+2y)$ units.	
2) Take pieces of paper with sizes $(x \times x)$ squ. units, $(y \times y)$ squ. units and $(x \times y)$ squ. units.	
3) Stick the papers in activity 2 on rectangular paper taken in activity step 1.	
4) Write the total numbers of papers of different sizes used above.	

Questions : 1) What is the area of the rectangular paper ?

2) $(2x+3y)(x+2y) = ?$

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Date.........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Activity – 9   : Algebraic Identity.
$(a+b)^2 = a^2 + 2ab + b^2$

Material   : Square papers, sketch Pen, scale.

Description of the activity	Your Comments
1) Take a square sheet of paper. Make along one of its horizontal side, a linear portion of 'a' unit. Now extend that line by 'b' unit in such a way that one complete edge of the square sheet is marked.	
2) Do the same work along one of the vertical side of that square paper.	
3) Draw like the figure shown.	
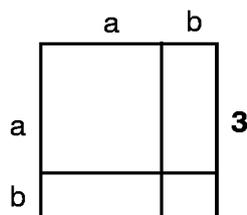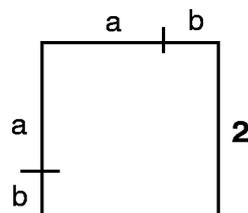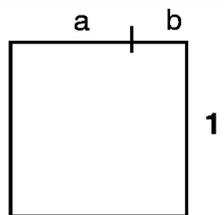
Questions :   1)   What is the area of the. square sheet of paper ?

2)   How many geometrical figures are formed in the figure no - 3 and what are they ?

3)   What are the individual area of the geometrical figures formed in figure no-3 ?

4)   Are the areas of first square sheet of paper and third square sheet of paper same?

5)   How many same type of figure are in the third figure ?

6)   Write the formula of $(a+b)^2$.

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

(9)

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 10 : Geometrical explanation of the algebraic identity, $(a+b)^2 = a^2+2ab+b^2$.

Material : Papers, scissors, sketch Pen, scale etc.

Date.........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a square sheet of paper of side (a+b) unit. $(a+b)$ $\leftarrow a \rightarrow \leftarrow b \rightarrow$ $(a+b)$	
2) Take two square sheet of paper of sides 'a' and 'b' unit respectively. a b	
3) Take two rectangular sheet of paper of length 'a' unit and breadth 'b' unit. a a b b	
4) Put with the smaller sheet taken in step-2 and 3. in sheet taken in step 1.	

Questions :
1) Is the larger sheet- of paper is exactly filled with the smaller pieces ?
2) What is the relation between the area of the larger sheet and the collective area of the four smaller sheet ?
3) What will be the shape of the square sheet of paper formed by four smaller sheet?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

(10)

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 11 : Geometrical Explanation of the Algebraic Identity $(a-b)^2 = a^2 - 2ab + b^2$

Material   : Paper, Sketch Pen, scale.

Date.........................

Name of the School..

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take two square papers of side 'a' unit and 'b' unit respectively. ←a→ ←b→ 2) Take one square paper of side '(a – b)' unit. (a – b) (a – b) 3) Take two rectangular papers of length '(a – b)' unit and breadth 'b' unit respectively. (a – b) (a – b) b b 4) Put in the larger Paper the small pieces obtained in step - 2 and step - 3.	

Questions : 1) What are the areas of the different pieces of paper ?

2) What is the relation between the area of the larger piece and collective area of the other four pieces ?

3) Is the formula $(a - b)^2$ verified ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 12 : Geometrical explanation of the Algebraic identity $a^2 - b^2 = (a+b)(a-b)$

Material : Papers, scissors, sketchpen, scale.

Date..........................
Name of the School...
....
write the names of the participants (not more than 5 or 10).
1) ....
2) ....
3) ....
4) ....
5) ....

Description of the activity	Your Comments
1) Take two square papers of sides 'a' unit and 'b' unit respectively. 2) Place the smaller piece of paper on the larger one and give dotted mark with your pen as shown in the following diagram. 3) Cut the square area of side 'b' with your scissors and also cut along the dotted line into pieces. 4) Make a rectangular diagram with the two smaller pieces of step-3	
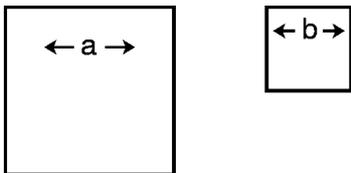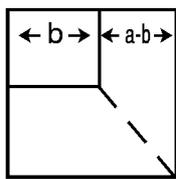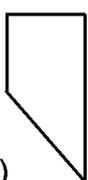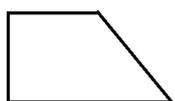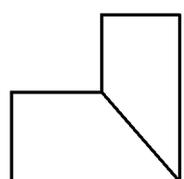
Questions :
1) What type will be the rectangular diagram in step - 4 ?
2) What will be the area of the rectangle ?
3) What is the area of the figure (ii) ?
4) What is the relation between the area of the figure(iii) and the area of the rectangle in figure (iv)

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 13 : Geometrical explanation of $(a+b)^2 - (a-b)^2 = 4ab$

Material : Papers, scissors, sketch pen, scale.

Date.........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take two square papers of side '(a+b)' unit and '(a–b)' unit respectively. Then label them like the given diagram. **1 (a)** **1 (b)**	
2) Place the smaller piece on the larger one in such a way that 'E' coincides with 'A' use your pen to draw like the diagram given. **2 (a)**	
3) Cut with scissors along HG and GF. **3 (a)**	
4) Again, cut along RQ and paste like the figure given. **4 (a)**	
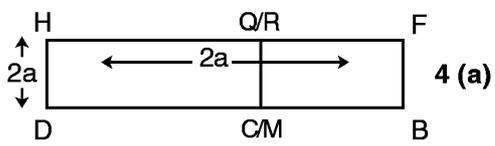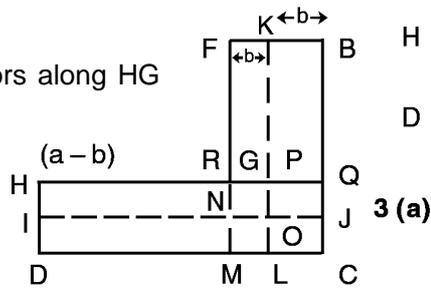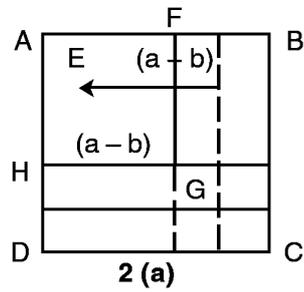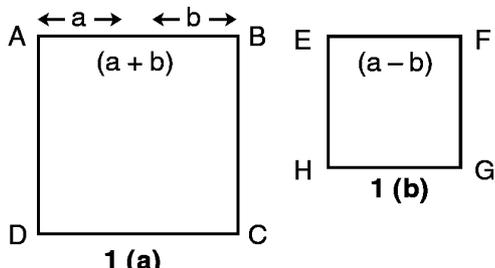
Questions : 1) What is the area of the figure 3 (a) ?

2) What is the area of the figure 4 (a) ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 14 : Geometrical explanation of $(a+b)^2+(a-b)^2 = 2(a^2+b^2)$

Material   : Papers, sketch Pen, scissors, Adhesive

Date........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take two square papers of side '(a+b)' unit and '(a–b)' unit respectively. 2) Place the smaller square beside the larger square like the following diagram. 3) Cut the portion RKIH and place it on the diagram at FG like following figure.	

Question :   1)   What are the areas of the different various geometrical figures obtained in different steps ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Date..........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Activity – 15 : Algebraic Identity – $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$.

Material　　　　: Papers, Pencil, Scale, Sketchpen.

Description of the activity	Your Comments
1)　　Mark the line segments of lengthes 'a' unit, 'b' unit and 'c' unit on the same line segment OA in succession. 2)　　Do the same marking on another line segment OB, which is just perpendicular at O. 3)　　Draw as many squares and rectangles as possible, with your pencil and colour them with your sketchpens.	
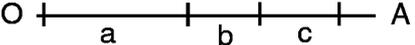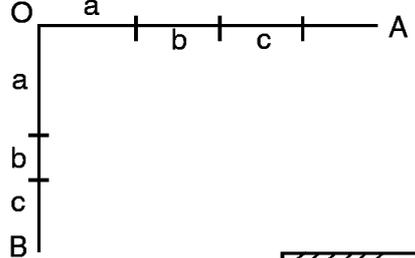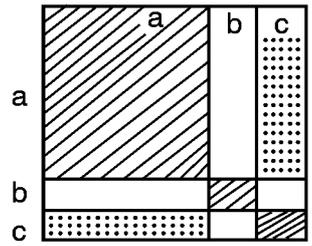
Questions : 1)　　How many squares and rectangles you have obtained in step - 3 and what are their areas ?

2)　　What is the area of the largest square obtained in step - 3 ?

3)　　Write the formula of $(a+b+c)^2$.

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

(15)

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 16 : Geometrical explanation of the algebraic identity $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$.

Material   : Papers, Scale, Pencil, Adhesive.

Date.........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take three square papers of side 'a' unit, 'b' unit and 'c' unit. Also take three rectangular papers of dimension 'axb', 'bxc' and 'cxa'.	
2) Take a larger piece of square paper of side '(a+b+c)'	
3) Fill the larger square by placing the smaller pieces of paper taken in step 1.	
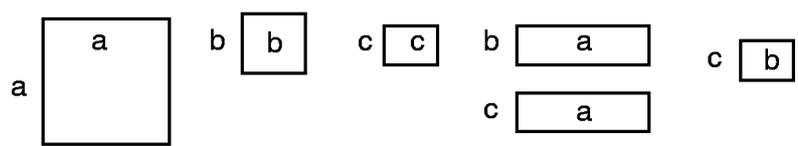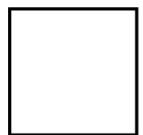
	a	b	c
a	a^2	ab	ac
b	ab	b^2	bc
c	ac	bc	c^2

Questions :

1) What is the area of each of the smaller pieces of paper ?

2) What is the area of the larger paper ?

3) Is the larger paper just filled with the smaller papers ?

4) Write the formula of $(a+b+c)^2$.

5) Is the formula true for different values of a, b, c ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 17 : Algebraic formulla - Commutative law.

Sub unit : To verify the relation 5+7 = 7+5.

Materials : Some discs of different colours, plate.

Date.........................
Name of the School...
....
write the names of the participants (not more than 5 or 10).
1) ....
2) ....
3) ....
4) ....
5) ....

Description of the activity	Your Comments
1) Take 5 white discs in a plate and 7 black discs in another plate. **(i)** **(ii)** 2) Mix the above discs in a single plate. **(iii)** 3) In another plate take 7 black discs at first then take 5 white discs in the same plate. **(iv)**	
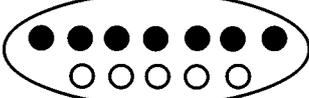
Questions : 1) How many discs are there in the larger Plate (iii) taking 5 white and 7 black discs ?

2) Is the number of total discs in plate (iv) & plate (iii) same ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Date..........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Activity – 18 : Algebraic formula - Associative law.

Sub-unit : To verify the relation (2+3)+5 = 2+(3+5)

**Material** : Some discs of different colours, Plate.

Description of the activity	Your Comments
1) Take theree plates . Take two discs in the first plate, three black discs in the second and five red dises in the third plate. **(i)** **(ii)** **(iii)** 2) Mix the discs of the first two plates and keep them in a single plate. **(iv)** **(iii)** 3) Keep all the discs of two plates in a single plate. **(v)** 4) In the another one plate take two white discs and one another plate take three black and 5 red discs together. **(vi)** **(vii)** 5) Keep all the disces of two plates no (vi) & (vii) in a single plate. **(viii)**	
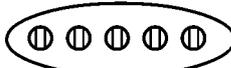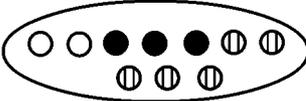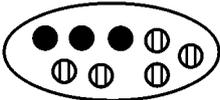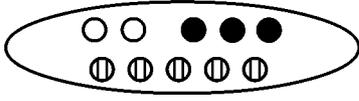
Questions :
1) How many discs are in plate (v) ?
2) How many discs are in plate (viii) ?
3) Is there any difference between the magnitudes of (2+3)+5 and 2+(3+5) ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 19 : Algebraic Formula - Distributive law.

Sub-unit : To verify the relation 2. (3+5) = 2.3 + 2.5.

Materials : Some discs of different colours, Plate.

Date..........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....
2) ....
3) ....
4) ....
5) ....

Description of the activity	Your Comments
1) Take three white discs and five black discs in two plates and mix them in a larger plate and count. **(i)** **(ii)** **(iii)**	
2) Keep same no. of discs in another larger plate like plate (iii). **(iv)**	
3) Mix the discs of plate no-(iii) and plate no (iv) in a single plate and count the no. of white and black discs. **(v)**	
4) Take 6 white discs in a group and 10 black discs in two separate plates. **(v)** **(vi)**	
5) In another (v) larger plate take all discs from plate (v) & (vi).	
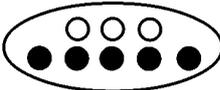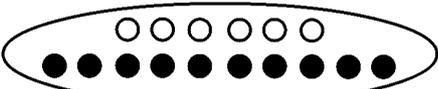
Questions : 1) How many discs were in the plate no (v)

2) How many white and black discs are there in the plate ?

3) In the larger plate how many discs were in step 5 ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 20 : To solve the equation ax+b=o (a>o, b>o).

Subunit : to solve the equation 4x+12=0

Materials : Round disc having white colour on one side and black colour on other side, plate.

Special Direction : Take +1 on white side and -1 on black side of the disc.

Date..........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take four red discs (suppose it is unknown) in a plate, twelve white discs in another plate and take anempty plate. Place them like the following figure.	
2) Keep twelve discs in the empty plate and place it in inverted position.	
3) Divide these twelve black disces with from equal groups.	

Questions :
1) How many black discs are in each group in step - 3 ?
2) What is the collective value of the discs in each group ?
3) What is the magnitude of the unknown quantity ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 21 : To verify that, 'two opposite angles to two equal sides of a triangle are equal' by folding papers.

Materials : Papers, scale, Pencil, scissors, Protractor.

Date.........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a Triangular paper ABC	
2) Draw a line of length equal to that of the smaller side, on any side from the opposite vertex. Then fold the paper along BD.	
3) Cut it along the folding.	
4) Fold the paper along AO as in the following picture such that B coincides with D.	
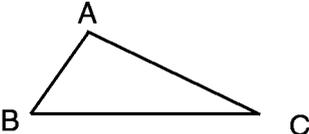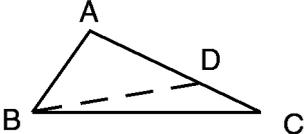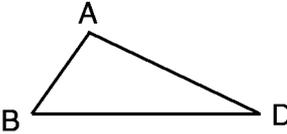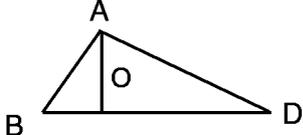
Questions : 1) What is the type of the triangle ABD ?

2) What is the measurement of the two angles ∠ABO and ∠ADO ?

3)   Does the side AB coincide with the side AD ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 22 : To construct the angles 30º and 60º by paper folding.

Materials : Papers, scissors, protractor.

Date..........................

Name of the School..

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a square paper A B C D.	
2) Make a round packet having centre of A. Hold the paper at 'A', keep your two fingers below the point 'B' and above the point 'D' and adjust it in such a way that, AD coincides with AE and AB coincides with AF, when folded.	
3) unfold the folder paper.	
4) Cut the three angles ∠DAF, ∠ FAE and ∠EAB.	
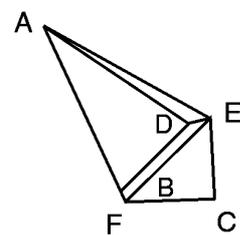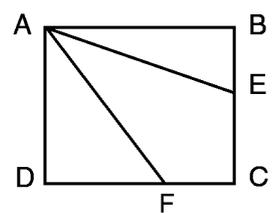
Questions :
1) What is the measurement of angle ∠ADC ?
2) Are the shapes of the three pieces ∠DAF, ∠FAE and ∠BAE equal ?
3) What are the magnitudes of the above three angles ?
4) What is the collective measurment of any two angles ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Date..........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Activity – 23 : To construct the angles 45º and 90º by folding papers.

Material : Papers, Scissors, Protractor.
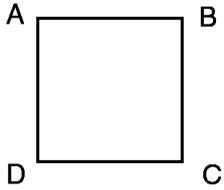
Description of the activity	Your Comments
1) Take a square paper ABCD.	
2) Fold the paper along AC such that the point 'B' coincides with the point 'D'	
3) Cut the square paper along AC into two pieces.	
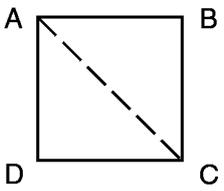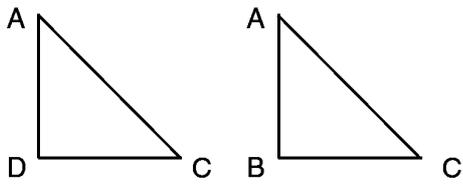
Questions :

1) What type of geometrical figures are ADC and ABC ?

2) Are the two pieces of paper similar ?

3) What are the measurements of ∠ACD and ∠ACB ?

4) What are the measurements of ∠ADC and ∠ABC ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 24 : To construct the angle 75° by folding papers.

Materials **:** Papers, scissors, Protractor.

Date.........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a square paper and do the steps in constructing the 60° such that you obtain the following figure.	
2) Like the given figure fold the paper such that the edge AD just coincids with AF. As a result you will get the fold AG.	
3) Cut the Part ∠GAB.	
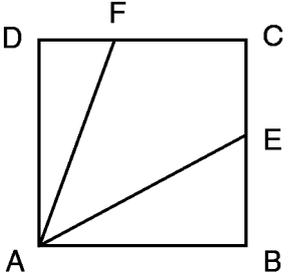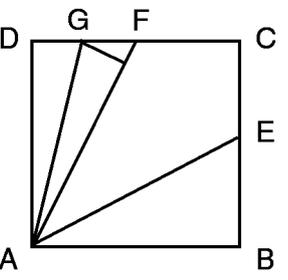
Questions : 1) What is the measurement of the angle ∠FAD ?

2) How many part of ∠FAD is obtained when the paper is folded along AG ?

3) What are the measurements of ∠DAG and ∠GAF= ?

4) What is the measurement of ∠BAG ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 25 : To Construct The angle 120° by folding papers.

Material : Papers, scissors, scale, Protractor.

Special Direction : It will be easier to constrnct the angle 120°, if the rectangular Paper has the dimemison 10cm x 8cm.

Date.........................

Name of the School..

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a rectangular paper ABCD.	
2) Fold the paper lightly at the middle portion (of AB) along its breadth..	
3) Hold at the Point E, at the bottom of the fold, make a round Packet by 3 complete rounds.	
4) Cut along either BED or AEC.	
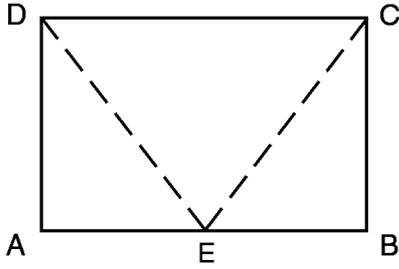
Questions : 1) How many angles are formed at the point E ?

2) Are the angles equal, formed at E ?

3) What are the measurements of ∠BED or ∠AED ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 26 : To construct the angle 105⁰ by folding papers.

Material   : Papers and Scissors.

Date.........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a rectangular paper and make it like the following figure according to the steps in the construction of the angle 120⁰.	
2) Fold the paper at E along the width and superimpose ED on EF and make it like the following figure.	
3) Cut the angle ∠GEB with scissors.	

Questions :
1) What is the measurement of the angle ∠FEB ?

2) When ED is superimposed on EF, Where the Paper is folded ?

3) What is the measurement of the angle ∠DEF

4) Are the angles ∠GEF and ∠DEG equal ?

5) What is the measurement of the angle ∠GEB ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 27 : To construct the angle 150° by folding papers.

Material : Papers and Scissors.

Date.........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a rectangular paper and make it like the following figure accordings to the steps in the construction of the angle 120°. 2) Divide the angle ∠BEC into two equal Parts by folding. 3) Cut the portion ∠AEF.	
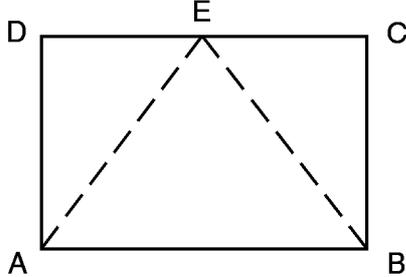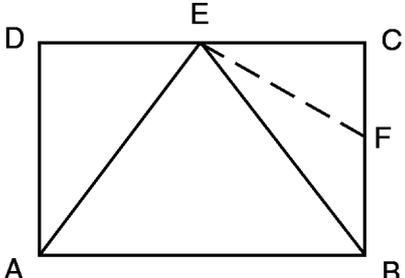
Questions : 1) Are the angles ∠CEF and ∠FEB equal ?

2) What is the measurement of the angle ∠FEB ?

3) What is the measurement of the angle ∠AEF ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 28 : To construct the angle 135º by folding papers.

Materials : Papers, Scissors, Protractor.

Date.........................

Name of the School..

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a rectangular paper and make it like the following figure according to the steps in the construction of the angle 120°. 2) Divide the angle ∠DEA into four equal parts, folding it twice consecutively. 3) Cut the angle ∠HEB.	
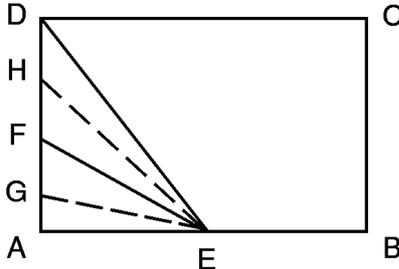
Questions :

1) Are the three angles ∠BEC, ∠CED and ∠DEA equal ?

2) How many angles equal to ∠DEA are formed and what is the measurement of each angle ?

3) What is the measurement of the ∠HEB ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 29 : To construct the 80° angle (without protractor)

Material : Compass, Scale, Pencil, Protractor, Papers.

Date.........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Draw a line segment AX on a paper. Draw an arc with any radius and centre at A, such that the arc meets AX at B. Take centre at B and draw two arcs with the previous radius, these two arcs meet the first at C and D respectively. Taking centres at C and D draw two arcs which meet at E. Join AE. Taking centre at C extend the arc from E to F with same radius 2) Now taking cenres at E and F draw two arcs with the same radius. These two arcs meet at G. Join AG. 3) Measure the angle ∠GAX with protractor.	

Questions : 1) What is the measurement of the angle ∠EAB ?

2) What is the measurement of the angle ∠GAB ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

(29)

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Date.........................

Name of the School..

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Activity – 30 : To draw a quadrilateral, when four sides and one diagonal are given.

Material : Papers, scale, compass and pencil.

Description of the activity	Your Comments
1) Draw five line segments a, b, c, d and e on a paper. a ─────────────── b ───────────── c ───────────── d ──────────── e ─────────── 2) Take a line segment AX on a paper. Cut AC which is equal to given 'a'. Draw two arcs with radius 'b' and 'c' taking centre at 'A' and 'C' respectively on the same side of AX. Suppose the two arcs meet at 'B'. Again draw two arcs with radius 'd' and 'e' taking centre at 'C' and 'A' respectinvely on the other side of AX. Join $\overline{AB}, \overline{BC}, \overline{CD}$ and $\overline{DA}$. 	
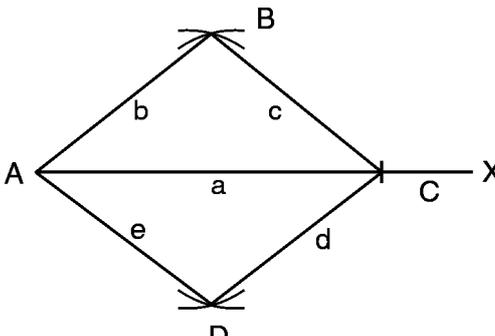
Questions : 1) What type of geometrical figure is ABCD ?

2) What is the name of AC ?

3) If the lengths of four sides only are given, is it possible to draw the quadrilateral ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 31 : To draw a quadrilateral when four sides and an angle are given.

Material : Papers, Compass, Protractor, and Scale.

Date..........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Take a Paper. Draw four line segments and an angle on that paper. a _____ b _____ c _____ d _____ 2) Draw any line segment AX on a paper. Draw an angle ∠YAX equal to the given one at the point 'A'. Cut 'AD' from AX equal to the given 'b' and AB from AY equal to the given 'a'. Draw two arcs having radius 'c' and 'd' taking centres at 'B' and 'D' respectively. Suppose these two arcs meet at C. Join $\overline{BC}$ and $\overline{DC}$.	
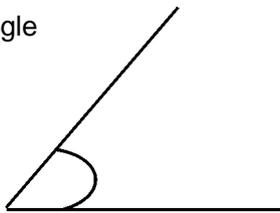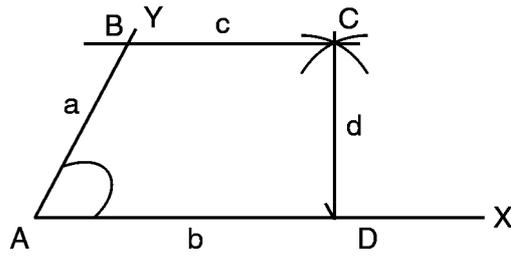
Question : 1) What type of geometrical figure is ABCD ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

(31)

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 32 : To Verify the properties of translational motion.

Materials : Stick or wire, chalk, scale and Protractor.

Date.........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Make a shape of an angle by a wire or sticks and mark the Primany position with a chalk. 2) After marking the initial position of the angle , push it to a second position and mark it with a chalk. 3) Use scale and protractor to measure AA′, BB′, CC′ and ∠ABC, ∠A′B′C.	
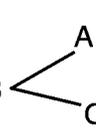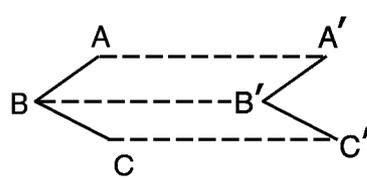
Questions :
1) What are the lengths of AB & A′B′, BC & B′C′ ?
2) Are the lengths equal ?
3) Is there any change from ∠ABC to ∠A′B′C′ ?
4) What is the relation among AA′, BB′ and CC′ ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Activity – 33 : To verify the properties of Rotational motion.

Material : A hard Piece - board, one nail, thread, Pencil and compass.

Date.........................

Name of the School...

....

write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Description of the activity	Your Comments
1) Draw a circle with pencil and compass.	
2) Write 1-12 in the circle like a clock and insert a nail at the centre.	
3) Fasten a thread with the nail and rotate it from 12 to 1,2,3 . . . 10,11 etc.	
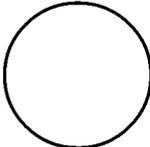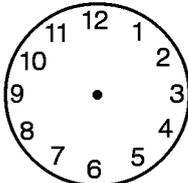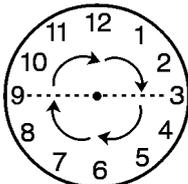
Questions : 1) When the thread is rotated towards each mark in the circle 1, 2,3 . . . 11,12 is the thread at rest at any position ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.	Date........................ Name of the School.. .... write the names of the participants (not more than 5 or 10). 1) .... 2) .... 3) .... 4) .... 5) ....

Activity – 34 : Reflection and Properties of Reflection.

Materials : Papers, Pen, scale and Protractor.

| Description of the activity	Your Comments
1) Take a rectangular paper and fold it in middle portion. On one portion of the folded paper draw a triangle ABC and take a point 'D' on AB. 2) Now unfold the paper. Mark A′B′C′ on the mark shaded by ABC and draw a line segment PQ along the folding. Join AA′, DD′, BB′, CC′ with your scale and pencil. 	
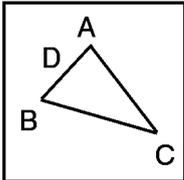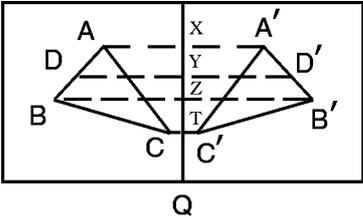
Questions :
1) Is there any change in the shape of the triangle ?
2) Measure $\overline{AX}$ & $\overline{XA'}$, $\overline{DY}$ & $\overline{YD'}$, $\overline{BZ}$ & $\overline{ZB'}$ and $\overline{CT}$ & $\overline{TC'}$ with your scale.
3) Observe whether the lengths $\overline{AX}$ & $\overline{XA'}$, $\overline{DY}$ & $\overline{YD'}$, $\overline{BZ}$ & $\overline{ZB'}$ or $\overline{CT}$ & $\overline{TC'}$ are equal or unequal.
4) What is the name of the line PQ ?
5) What is the relation between the triangles ABC & A′B′C′ ?
6) Measure the angles ∠PXA, ∠PYD, ∠PXB and ∠PTC with your protractor.
7) Where is the position of 'B' with respect to PQ after reflection ?
8) Is the line joining a point object and its image perpendicular to the line of reflection?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

WORK SHEET FOR CLASS VII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add appropriate questions if necessary.

Date.........................

Name of the School...

....
write the names of the participants (not more than 5 or 10).

1) ....

2) ....

3) ....

4) ....

5) ....

Activity – 35 : Concept of the properties of Rotational motion.

Materials : Hard Paper, two triangles of same shape made of Piece - board, Adhesive, Sketchpen, Protractor.

Description of the activity	Your Comments
1) At first draw a line segment OA on the hard paper. Then draw a 30° angle at O. 2) Place the triangles on the arms of the angle drawn. 3) Stick the triangles like the following figure. 	

Questions : 1) What is the centre of rotation ?

2) What is the new position of the point 'P' after rotation.

3) What is the measurement of the angle of rotation of the point 'P' ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

MATHEMATICS THROUGH ACTIVITY
Continuous And Summative Evaluation of Learners' Activity.

Learners' Name :

Class :   **Section :**   **Roll No :**

It is clearly mentioned in the notice (No- SSA/226/08. date : 29/12/2008) regarding evaluation for the schools approved by West Bengal Board of Secondary Education that, oral examination may be replaced by Project Secondary Education that, oral examination may be replaced by Project work. So it is proposed that the evaluation -sheet in this supplementary book may be used for each learner instead of oral examination of 10 marks in Mathematics. It is advised to do each activity as a group-work. Though the learners do their activity in a group, they should write their observations and remarks in their work-sheet in own language either individually or after discussing with their co-learners. The learners should write their queries individually, too, about their activities. the teachers while evaluating, each activity should consider 4 point scale A,B,C,D to calculate the efficiency with regard to te following abilities of the learners –

a)   Ability to do the work, mixing with others in the group.

b)   sincerity, seriousness, enthusiasm and regularity in every-activity on its part.

c)   Leadership.

d)   Special ability to observe/remark.

e)   Ability to analyse information/result.

f)   Ability to express valued opinion.

g)   Ability to solve a problem.

h)   Ability to frame perfect and clear sentences.

i)   Ability to question properly about the activity.

j)   Ability to apply Mathematics in practical life.

k)   Ability to express in mathematical language.

Mathematics Through Activity

Considering above mentioned points teachers may award grade to he learner's on the basis of 4 point scale A = very good, B = good, C= Average and D = needs improvement. They can evaluate the learner's for obtaining average grade in project work.

Work Sheet No.	Abiltty (a)	Abiltty (b)	Abiltty (c)	Abiltty (d)	Abiltty (e)	Abiltty (f)	Abiltty (g)	Abiltty (h)	Abiltty (i)	Abiltty (j)	Abiltty (k)	Teacher's signature	Guardian's signature
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