

# Work Sheet -- S A 2

Sub : Mathematics

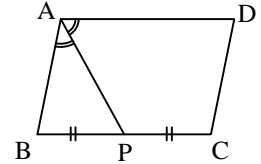
Class: IX

1) Perimeter of rectangle is 42 cm. Express this information in the form of a linear equation in 2 variables.

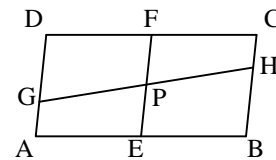
2) Find the value of 'a' so that  $5x+2ay = 3a$  has a solution  $(-4,1)$

3) Draw the graph of  $2(x+1) = 3(y+1)$ . From the graph find the value of y when  $x = -\frac{3}{2}$

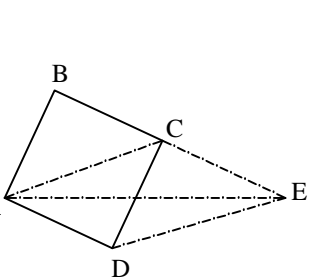
4) P is the mid point of the side BC of  $\square ABCD$  such that  $\angle BAP = \angle DAP$ .  
Prove that  $AD = 2AB$



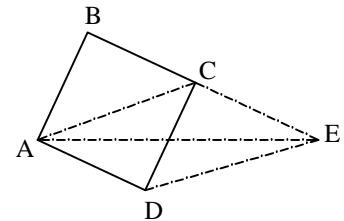
5) In trapezium ABCD,  $AB \parallel DC$ . E is the midpoint of AD and  $EF \parallel AB$  where F lies on BC. Prove that  $AB + CD = 2EF$



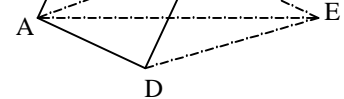
6) In the figure ABCD is a parallelogram in which E & F are the midpoints of AB & CD. If GH is a line segment that cuts AD, EF and BC at G, P & H respectively, Prove that  $GP = PH$ .



7) In a  $\square PQRS$ ,  $SM \perp PQ$  and  $QT \perp SP$ . If  $\text{ar}(\square PQRS) = 48 \text{ cm}^2$ ,  $PQ = 8 \text{ cm}$  and  $PS = 3 \text{ cm}$ , find SM and QT.

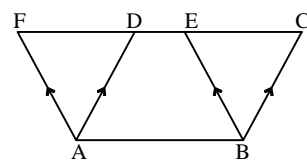


8) In quadrilateral ABCD, a line through D parallel to AC meets BC produced at E. Prove that  $\text{ar}(\triangle ABE) = \text{ar}(\text{quad. ABCD})$

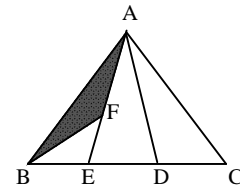


9) Given  $\text{ar}(\square ABCD) = 90 \text{ cm}^2$ . Find,

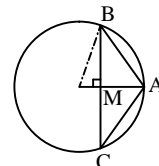
- i)  $\text{ar}(\square ABEF)$  ii)  $\text{ar}(\triangle ABD)$  iii)  $\text{ar}(\triangle BEF)$



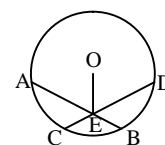
10) In the figure D, E & F are respectively the midpoints of BC, BD and AE of  $\triangle ABC$ . Prove that  $\text{ar}(\triangle ABF) = \frac{1}{8} \text{ar}(\triangle ABC)$



11) Given three non collinear points A, B & C. Prove that there is one and only one circle passes through A, B & C.

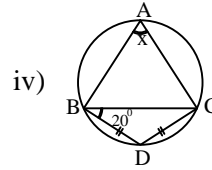
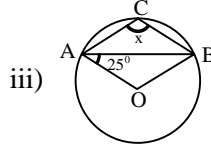
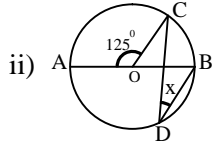
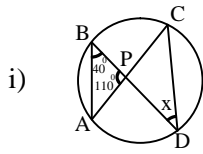


12) In a circle of radius 5 cm. AB & AC are two chords such that  $AB = AC = 6 \text{ cm}$ . Find the length of the chord BC.

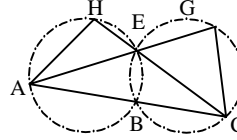


13) Two chords AB & CD of a circle with center O intersect at E. If  $\angle OEA = \angle OED$ . Prove that  $AB = CD$ .

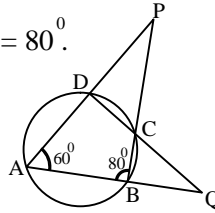
14) Find the value  $x$  from the following figures.



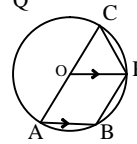
15) In the figure ABC, AEG and HEC are straight lines. Prove that  $\angle AHE$  and  $\angle EGC$  are supplementary.



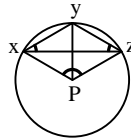
16) In the figure  $\angle A = 60^\circ$  and  $\angle ABC = 80^\circ$ . Find  $\angle DPC$  and  $\angle BQC$ .



17) In the figure, O is the center of the circle and  $AB \parallel OP$ . Prove that  $PC = PB$ .



18) In the figure P is the center of the circle. Prove that  $\angle XPZ = 2(\angle xzy + \angle yxz)$



19) Construct a triangle with base length 5 cm, sum of the other two sides 7.8 cm and one base angle of  $60^\circ$ .

20) Construct a triangle with base length 7.5 cm, the difference of the other two sides 2.5 cm and one base angle is  $45^\circ$ .

21) Construct  $\triangle ABC$  with perimeter 8 cm and the angles in the ratio 3: 4 : 5.

22) Construct  $\triangle ABC$ , in which  $BC = 5$  cm,  $\angle C = 30^\circ$  and  $AB - AC = 2$  cm.

23) A swimming pool is 30 m in length 15 m in breadth and 4 m in deep. Find the cost of cementing its floor and walls at the rate of ₹ 12 per  $m^2$ .

24) The cost of papering the four walls of a room at 90 paise /  $m^2$  is ₹ 202.50. The height of the room is 5 m. Find the length and breadth of the room if they are in the ratio 4:1.

25) Water in a canal, 30 dm wide and 12 dm deep, is flowing at a speed of 20 km / hr. How much area will it irrigate in 30 minutes, if 9 cm of standing water is desired?

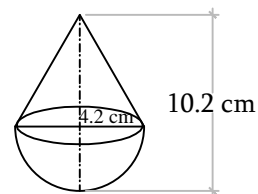
26) The ratio of the CSA and TSA of cylinder is 1: 2. If the TSA is  $616 \text{ cm}^2$  find the volume of the cylinder.

27) The difference between the outer surface area and inner surface area of a cylindrical metallic pipe 14 cm long is  $44 \text{ cm}^2$ . If the pipe is made of  $99 \text{ cm}^3$  of metal, find the outer and inner radii of the pipe.

28) A piece of paper having the form of a quadrant of a circle of diameter 28 cm is rolled up so as to form a cone. Find the i) radius of the base ii) curved surface area and iii) volume of the cone.

29) Three solid spheres of iron whose diameters are 2 cm, 12 cm and 16 cm respectively are melted into a single solid sphere. Find the T.S.A. of the new sphere

- 30) A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm, find the volume of the wooden toy.



- 31) The daily maximum temperature ( in degree Celsius ) recorded in a certain city during the month of November are as follows.

25.8 , 20.9 , 24.5 , 23.1 , 25.6 , 22.4 , 20.7 , 21.5 , 21.8 , 22.7 , 20.7 , 22.8 , 20.6 , 22 , 20.9 , 23.9 , 22.3 , 24.7 , 22.7 , 23.1 , 23.8 , 22.8 , 24.6 , 22.9 , 23.4 , 21.7 , 21.1 , 21.3 , 20.5 , 22.7

Represent this information in the form of a Frequency distribution table with class size  $1^{\circ}\text{C}$ . Also draw a histogram for the same.

- 32) Following is the distribution of ages ( in years ) of two groups of teachers in a school.

age (in years)		55 - 60	50 - 55	45 - 50	40 - 45	35 - 40	30 - 35	25 - 30	20 - 25
No. of teachers	group A	1	5	7	12	11	8	10	4
	group B	2	7	9	11	10	8	6	5

Represent the above data by means of a frequency polygon for each group on the same axes .

- 33) Draw a histogram to represent the following frequency distribution

daily wages ( in Riyals)	10 - 15	15 - 20	20 - 25	25 - 30	30 - 40	40 - 60	60 - 80
No. of workers	7	10	27	15	12	12	8

- 34) Find the missing frequency 'k' of the following data if its mean is 16 .

x	5	10	15	20	25
f	2	8	k	10	5

- 35) The mean of 5 nos. is 28. If one of the nos. is excluded , the mean gets reduced by 2 . Find the excluded number .

- 36) The weight of 10 students ( in Kg.) are 55 , 51 , 60 , 52 , 42 , 38 , 49 , 63 , 47 and 35 . Find the median weight . If the weight 63 Kg. is replaced by 36 Kg. , find the new median weight .

- 37) For what value of p , the mode of the following data is 5 ?

1 , 2 , 5 , 7 , 5 , 2 , 7 , 5 , 9 , 2 , 3 , p , 11

- 38) Arrange the following nos. in a frequency distribution table and then find the mean , median and mode of the data .

7 , 4 , 3 , 5 , 6 , 3 , 3 , 2 , 4 , 3 , 4 , 3 , 3 , 4 , 4 , 3 , 2 , 2 , 4 , 3 , 5 , 4 , 3 , 4 , 3 , 4 , 3 , 1 , 2 , 3

- 39) A bag contains cards numbered from 1 to 100 . A card is drawn at random from the bag. Find the probability that the card bears a number which is a

i) multiple of 5      ii) multiple of 6      iii) multiple of both 5 & 6

40) Three coins are tossed simultaneously 200 times and the outcomes are shown below.

Out come	3 heads	2 heads	1 heads	no head
Frequency	23	72	77	28

Find the probability of getting ,

- (i) exactly 2 heads                      (ii) at least one head                      (iii) at most one head

41) M C Q :

1 ) Length of the longest rod that can be kept in a cuboidal room of dimensions 10 m x 10 m x 5 m is

- [A] 5 m      B) 10 m      C) 15 m      D) 12 m ]

2 ) Volume of a cube is  $1000 \text{ cm}^3$ . Its surface area is

- [A]  $400 \text{ cm}^2$       B )  $100 \text{ cm}^2$       C)  $600 \text{ cm}^2$       D)  $6000 \text{ cm}^2$  ]

3 ) Volume of a hemisphere is  $88 \sqrt{21} \text{ cm}^3$ . Its radius is

- [A] 21 cm      B)  $7\sqrt{3} \text{ cm}$       C)  $3\sqrt{7} \text{ cm}$       D)  $\sqrt{21} \text{ cm}$  ]

4 ) Which of the following is not true for a parallelogram ?

- [A] opposite sides are equal      B) opposite angles are equal  
C) opposite angles are bisected by diagonals      D) diagonals bisect each other ]

5 ) The ratio of the angles a quadrilateral is 3 : 7 : 6 : 4 , then the quadrilateral is a

- [A] Trapezium      B) Parallelogram      C) Rhombus      D) Kite ]

6 ) O is the center of the circum circle of  $\triangle ABC$  and  $\angle OAB = 40^\circ$  then  $\angle ACB =$

- [A]  $40^\circ$       B)  $20^\circ$       C)  $100^\circ$       D)  $50^\circ$  ]

7 ) AD is the diameter of a circle of radius 17 cm and AB is a chord of the same circle of length 30cm.

Then distance of AB from the center of the circle is

- [A] 17 cm      B) 15 cm      C) 4 cm      D) 8 cm ]

8 ) Graph of the linear equation  $ax + by + c = 0$  is a straight line passing through the origin if

- [A]  $a = b = c$       B)  $a = b$       C)  $a = b = 0$       D)  $c = 0$  ]

9 ) If a linear equation has  $(-3, 3)$ ,  $(0, 0)$  and  $(1, -1)$  as three of its infinite solutions.

Then it is of the form

- [A]  $-3x + y = 0$       B)  $x + y = 0$       C)  $y - x = 0$       D)  $x + y + 3 = 0$  ]

10) The mean of 3 consecutive nos. is 3 , their median is

- [A) 3      B) 4      C) 5      D) 6]

11) If the class mark and class size of a class are 9 and 4 respectively , then the lower limit of the class is

- [A) 5      B) 7      C) 4.5      D) 11]

12) A coin is tossed twice. The probability of getting at least one head is

- [A)  $\frac{1}{2}$       B)  $\frac{3}{4}$       C)  $\frac{1}{4}$       D)  $\frac{3}{8}$ ]

## Answers/ Hints

1)  $x + y - 21 = 0$  .

2) - 20

3) 0

4) Hint : Prove  $\angle BPA = \frac{1}{2}\angle A$  and  $AB = BP \Rightarrow AD = 2 AB$

5) Hint : Prove F is the mid point of BC by using mid point theorem . Find the length of EF.

6) Hint : Prove  $AD \parallel EF \parallel BC$  and use equal intercept theorem.

7) 6 cm , 16 cm

8) Hint : ar. (  $\triangle ACE$  ) = ar. (  $\triangle ACD$  ) add ar. (  $\triangle ABC$  ) on both sides

9) i)  $90 \text{ cm}^2$

ii)  $45 \text{ cm}^2$

iii)  $45 \text{ cm}^2$

10) Hint : Use the result , median divides a triangle into two triangles of equal area.

12) 9.6 cm

13) Hint : Draw  $OP \perp AB$  &  $OQ \perp CD$  and prove  $\triangle OPE \cong \triangle OQE$  .

14) i)  $30^\circ$       ii)  $27\frac{1}{2}^\circ$       iii)  $115^\circ$       iv)  $40^\circ$

15) Hint : Join BE , BG & BH and prove  $\angle EGC + \angle AHE = 180^\circ$

16)  $40^\circ$  ,  $20^\circ$

17) Hint : Join OB. Prove  $\angle COP = \angle BOP$  and  $\triangle COP \cong \triangle BOP$

18) Hint : Show  $2\angle xzy = \angle xpy$  and  $2\angle yxz = \angle ypz$  and add the two equations.

23) ₹ 9720.

24) 18 m, 4.5 m

25)  $400000 \text{ m}^2$

26)  $1078 \text{ cm}^3$

27) 2.5 cm , 2 cm

28)  $3.5 \text{ cm}$  ,  $154 \text{ cm}^2$  ,  $175.2 \text{ cm}^3$

29)  $1018.28 \text{ cm}^2$

30)  $266.11 \text{ cm}^3$

34) 15

35) 36

36) 50 Kg. , 48 Kg.

37) 5

38) 3.47 , 3 , 3

39)  $\frac{1}{5}$  ,  $\frac{4}{25}$  ,  $\frac{3}{100}$

40)  $\frac{9}{25}$  ,  $\frac{43}{50}$  ,  $\frac{21}{40}$

41) MCQ :

1) C

2) C

3) D

4) C

5) A

6) D

7) D

8) D

9) B

10) A

11) B

12) A