

**PART-A**

**SECTION-I**

**Answer the following (1 mark each)**

1. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability of getting neither a red card nor a queen.
2. A steel wire when bent in the form of a square encloses an area of  $121 \text{ cm}^2$ . If the same wire is bent in the form of a circle, then find the circumference of the circle.
3. In  $\triangle OPQ$  right angled at P,  $OP = 7 \text{ cm}$ ,  $OQ - PQ = 1 \text{ cm}$ . Determine the values of  $\sin Q$  and  $\cos Q$
4. Is series  $\sqrt{3}, \sqrt{6}, \sqrt{9}, \sqrt{12} \dots \dots$  an AP? Give reason.

**OR**

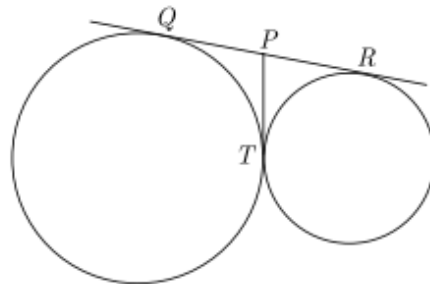
What is the next term of an AP  $\sqrt{7}, \sqrt{28}, \sqrt{63} \dots ?$

5. If the equations  $kx - 2y = 3$  and  $3x + y = 5$  represent two intersecting lines at unique point, then find the value of  $k$ .
6. Two different dice are tossed together. Find the probability that the product of the number on the top of the dice is 6.
7. If triangle  $ABC$  is similar to triangle  $DEF$  such that  $2AB = DE$  and  $BC = 8 \text{ cm}$  then find  $EF$
8. Find the positive root of  $\sqrt{3x^2 + 6} = 9$
9. Write the value of  $\cot^2 \theta - \frac{1}{\sin^2 \theta}$

**OR**

If  $k + 1 = \sec^2 \theta (1 + \sin \theta) (1 - \sin \theta)$ , then find the value of  $k$ .

10. In the figure,  $QR$  is a common tangent to given circle which meet at  $T$ . Tangent at  $T$  meets  $QR$  at  $P$ . If  $QP = 3.8 \text{ cm}$ , then find length of  $QR$ .



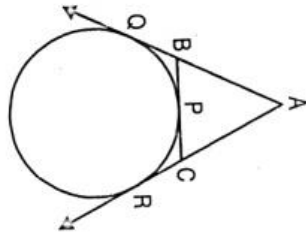
11. If the radius of the base of a right circular cylinder is halved, keeping the height same, find the ratio of the volume of the reduced cylinder to that of original cylinder.
12.  $ABC$  is an equilateral triangle of side  $2a$ , then length of one of its altitude is
13. If  $\text{HCF}(336, 54) = 6$ , find  $\text{LCM}(336, 54)$ .

14. Find median of the data, using an empirical relation when it is given that Mode = 12.4 and Mean = 10.5.
15. If one zero of a quadratic polynomial  $(kx^2 + 3x + k)$  is 2, then find the value of  $k$ .

**OR**

If one of the zeroes of the quadratic polynomial  $(k - 1)x^2 + kx + 1$  is  $-3$ , then find the value of  $k$ .

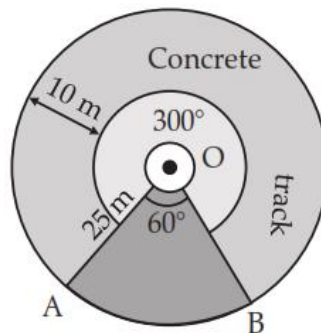
16. In fig, a circle touches the side BC of  $\triangle ABC$  at P and touches AB and AC produced at Q and R respectively. If AQ = 5cm, find the perimeter of  $\triangle ABC$ .



## **SECTION-II**

**Q17-Q20 are case study based questions.**

17. In a given figure,  $AOB$  is a flower bed in a shape of a sector of a circle of radius 25 m and  $\angle AOB = 60^\circ$ . Also a 10 m wide concrete track is made as shown in the figure, flower bed is made at the rate of rupees 3 per  $m^2$  and concrete track is made up of rate rupees 25  $m^2$



- (i) Find the circumference of the circle having radius 25 cm.
- (a) 158 cm                      (b) 157.14 cm                      (c) 156.21 cm                      (d) 155.28 cm
- (ii) Find the area of the sector  $AOB$ .
- (a) 326.5  $m^2$                       (b) 327.38  $m^2$                       (c) 327.90  $m^2$                       (d) 325.56  $m^2$
- (iii) The amount spent for making the flowerbed is:
- (a) 982.14                      (b) 928.14                      (c) 924.18                      (d) 948.12
- (iv) Find the area of concrete track.
- (a) 1047.61  $m^2$                       (b) 1407.16  $m^2$                       (c) 1740.4  $m^2$                       (d) 1774.16  $m^2$
- (v) The amount spent for making the concrete track is:
- (a) 25190.5                      (b) 20590.51                      (c) 26190.25                      (d) 24190.25
18. Amul, is an Indian dairy cooperative society, based at Anand in the Gujarat. Formed in 1946, it is a cooperative brand managed by a cooperative body, the Gujarat Co-operative Milk Marketing Federation Ltd. (GCMMF), which today is jointly owned by 36 lakhs (3.6 million) milk producers

in Gujarat. Amul spurred India's White Revolution, which made the country the world's largest producer of milk and milk products.

Survey manager of Amul dairy has recorded monthly expenditures on milk in 100 families of a housing society. This is given in the following frequency distribution:

Monthly expenditure (in Rs.)	0- 175	175-350	350-525	525-700	700-875	875-1050	1050-1125
Number of families	10	14	15	$x$	28	7	5

- (i) How many families spend between Rs 525- Rs 700 on milk?  
 (a) 21 (b) 38 (c) 17 (d) 26
- (ii) What is the upper limit of median class?  
 (a) 1225 (b) 875 (c) 1050 (d) 700
- (iii) What is the median expenditure on milk?  
 (a) 601.4 (b) 636.5 (c) 616.6 (d) 624.5
- (iv) What is the lower limit of model class?  
 (a) 1225 (b) 875 (c) 1050 (d) 700
- (v) What is the model expenditure on milk?  
 (a) 734.25 (b) 743.74 (c) 801.25 (d) 820.25

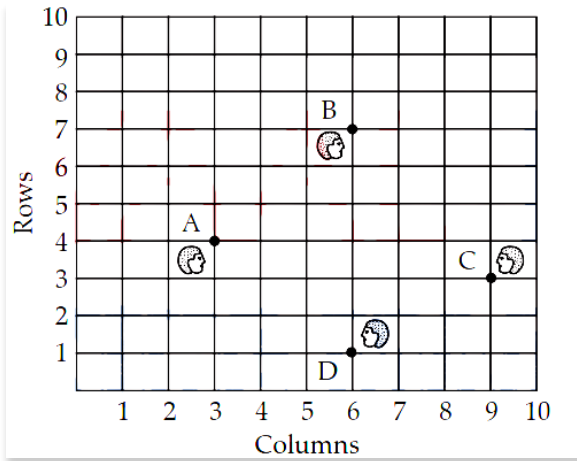
19. Jaspal takes a loan from a bank for his car.

Jaspal Singh repays his total loan of rupees 118000 by paying every month starting with the first instalment of rupees 1000. If he increases the installment by rupees 100 every month.



- (i) If the given problem is based on AP, then what is the first term and common difference?  
 (a) 1000, 100 (b) 100, 1000 (c) 100, 100 (d) 1000, 1000
- (ii) In how many months the loan will be cleared?  
 (a) 20 (b) 30 (c) 40 (d) 50
- (iii) The amount paid by him in 30th installment is  
 (a) 3900 (b) 3500 (c) 3000 (d) 3600
- (iv) The amount paid by him in 30 installments is  
 (a) 37000 (b) 73500 (c) 75300 (d) 53700
- (v) What amount does he still have to pay after 30th installment?  
 (a) 45500 (b) 44000 (c) 54500 (d) 44500

20. In a class room, 4 friends are seated at the points  $A, B, C, D$  as shown in figure.



Answer the following questions:

- (i) Champa and Chameli walk into the class and after observing for a few minutes, champa asks chameli, what is the shape of  $ABCD$ ?
- (a) Trapezium      (b) Rectangle      (c) Rhombus      (d) Square
- (ii) What is the coordinates of  $A$ ?
- (a)  $(3, 4)$       (b)  $(4, 3)$       (c)  $(3, 2)$       (d)  $(3, 5)$
- (iii) Find the distance between  $A$  and  $D$ .
- (a)  $3\sqrt{3}$  units      (b)  $3\sqrt{2}$  units      (c)  $2\sqrt{2}$  units      (d)  $2\sqrt{3}$  units
- (iv) Find the distance between  $B$  and  $C$ .
- (a)  $3\sqrt{3}$  units      (b)  $3\sqrt{2}$  units      (c)  $2\sqrt{2}$  units      (d)  $2\sqrt{3}$  units
- (v) Write the coordinates of  $C$ .
- (a)  $(9, 4)$       (b)  $(4, 9)$       (c)  $(4, 8)$       (d)  $(8, 4)$

## **PART- B**

### **Short Answer type questions (2 mark each)**

21. The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are  $30^\circ$  and  $45^\circ$ , respectively. Find the height of the multi-storeyed building.
22. Draw a circle of radius of 3 cm. Take two points  $P$  and  $Q$  one of its diameter extended on both sides, each at a distance of 7 cm on opposite sides of its centre. Draw tangents to the circle from these two points.

**OR**

Draw a circle of radius 4 cm. Draw two tangents to the circle inclined at an angle of  $60^\circ$  to each other.

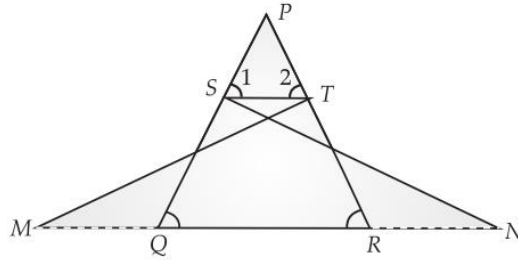
23. Find the zeroes of the quadratic polynomial  $7y^2 - \frac{11}{3}y - \frac{2}{3}$  and verify the relationship between the zeroes and the coefficients.
24. Find the ratio in which the point  $P(\frac{3}{4}, \frac{5}{12})$  divides the line segment joining the point  $A(\frac{1}{2}, \frac{3}{2})$  and  $B(2, -5)$
25. Show that  $\frac{1}{\sqrt{3}}$  is an irrational number.
26. Prove that the parallelogram circumscribing a circle is a rhombus

**Short Answer type questions (3 mark each)**

27. If the median of the following data is 240, then find the value of  $f$ :

Class interval:	0 – 100	100 – 200	200 – 300	300 – 400	400 – 500	500 – 600	600-700
Frequency:	15	17	$f$	12	9	5	2

28. In the given figure  $\angle 1 = \angle 2$  and  $\triangle NSQ \cong \triangle MTR$ , then prove that  $\triangle PTS \sim \triangle PRQ$ .

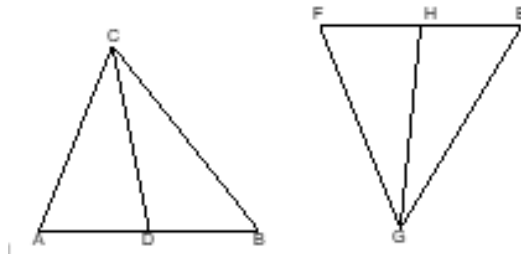


**OR**

In figure, CD and GH are respectively medians of  $\triangle ABC$  and  $\triangle EFG$ . If  $\triangle ABC \sim \triangle FEG$ , Prove

that (i)  $\triangle ADC \sim \triangle FHG$

(ii)  $\frac{CD}{GH} = \frac{AB}{FE}$



29. If the sum of the first  $n$  terms of an AP is  $\frac{1}{2}[3n^2 + 7n]$ , then find the  $n^{th}$  term. Hence write its  $20^{th}$  term

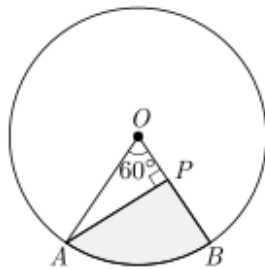
30. Prove that:  $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} = \sin A + \cos A$

**OR**

Prove that:  $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{Cosec} A + \cot A$ .

31. An aeroplane, flying horizontally 1 km above the ground, is observed at an angle of elevation of  $60^\circ$  from a point on the ground. After a flight of 10 seconds, the angle of elevation at the point of observation changes to  $30^\circ$ . Find the speed of the plane in m/s.

32. In the given figure,  $AOB$  is a sector of angle  $60^\circ$  of a circle with centre  $O$  and radius 17 cm. If  $AP \perp OB$  and  $AP = 15$  cm, find the area of the shaded region.



33. Two unbiased coins are tossed simultaneously. Find the probability of getting

(i) two heads

(ii) one head

(iii) at most one head

(iv) at least one head

(v) no head

**Long Answer type questions (5 mark each)**

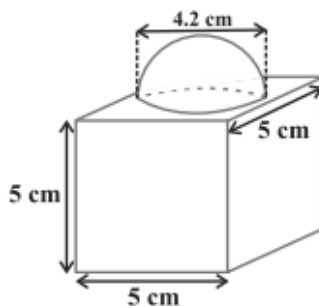
34. Solve for  $x$   $\left(\frac{2x}{x-5}\right)^2 + \left(\frac{2x}{x-5}\right) - 24 = 0, x \neq 5$

35. Roohi travels 300 km to her home partly by train and partly by bus. She takes 4 hours if she travels 60 km by train and the remaining by bus. If she travels 100 km by train and the remaining by bus, she takes 10 minutes longer. Find the speed of the train and the bus separately.

**OR**

Solve the following system graphically:  $x + y = 3$ ,  $2x + 5y = 12$ .

36. i) The decorative block shown in Fig is made of two solids — a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter of 4.2 cm. Find the total surface area of the block.



- ii) Find the volume of the largest right circular cone that can be cut out of a cube whose edge is 9cm