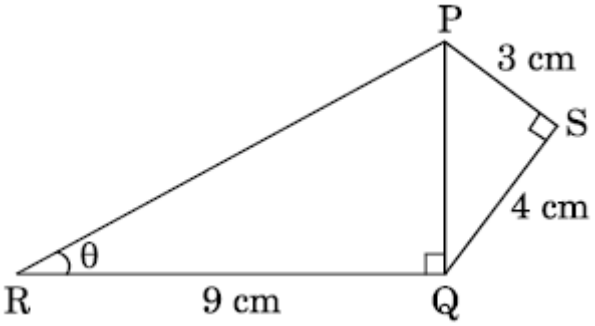
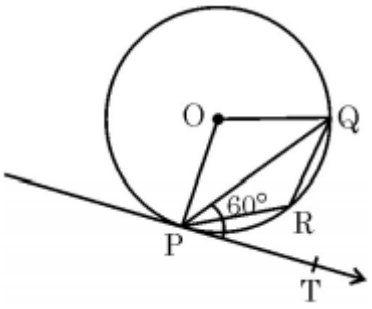
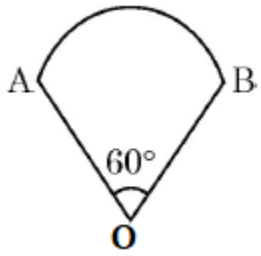
INDIAN SCHOOL AL WADI AL KABIR

Class X, Mathematics -***Sample Paper- Set 1***

15-12-2020

Q. No.	PART A
	Section 1: Q1 to Q16 carries 1 Mark each.
1.	The radius of a sphere (in cm) whose volume is 12π cm^3, is
2.	If HCF (336, 54) = 6, find LCM (336, 54).
3.	In Figure , PS = 3 cm, QS = 4 cm, $\angle$ PRQ = θ, $\angle$ PSQ = 90°, PQ $\perp$ RQ and RQ = 9 cm. Evaluate tan θ.  **OR** If $\cot A + \frac{1}{\cot A} = 2$, then find the value of $\cot^2 A + \frac{1}{\cot^2 A}$.
4.	Find the nature of roots of the quadratic equation $2x^2 - 4x + 3 = 0$.
5.	Evaluate : $\sin^2 60° + 2 \tan 45° - \cos^2 30°$ **OR** If $\sin A = \frac{3}{4}$, calculate sec A.
6.	DE is drawn parallel to base BC of Δ ABC, meeting AB in D and AC at E. If $\frac{AB}{BD} = 4$ and CE = 2 cm, find the length of AE.
7.	Two right circular cones have their heights in the ratio 1 : 3 and radii in the ratio 3 : 1, what is the ratio of their volumes ?

8.	A bag contains 3 red, 5 black and 7 white balls. A ball is drawn from the bag at random. The probability that the ball drawn is not black, is **OR** Two dice are thrown simultaneously. What is the probability that the sum of the two numbers appearing on the top is 13 ?
9.	The distance between the points (m, – n) and (– m, n) is **OR** Write the coordinates of a point P on x-axis which is equidistant from the points A(– 2, 0) and B(6, 0).
10.	For what values of k does the quadratic equation $4x^2 - 12x - k = 0$ have no real roots ?
11.	In Fig. PQ is a chord of a circle and PT is tangent at P such that $\angle QPT = 60°$, then the measure of $\angle PRQ$ is _____. 
12.	After how many decimal places will the decimal representation of the rational number $\frac{229}{2^2 \times 5^7}$ terminate ?
13.	Point $P\left(\frac{a}{8}, 4\right)$ is the mid-point of the line segment joining the points A(– 5, 2) and B(4, 6). The value of 'a' is
14.	The 9^{th} term of the A.P. – 15, – 11, – 7, ..., 49 is **OR** Find the sum of the first 100 natural numbers.

15.	The mean and median of a distribution are 14 and 15 respectively. The value of mode is
16.	The given figure is a sector of radius 10.5 cm. find the perimeter of the sector? $\left(\text{Take } \pi = \frac{22}{7}\right)$ 

Section-II: Q17-Q20

Case study-based questions are compulsory. Attempt any 4 sub parts from each question.

Each question carries 1 mark

17. **Case Study Based-1**

To promote cooperation, culture, creativity, sharing, self-confidence and other social values, a student adventure camp was organized by the school for class X students and their accommodation was planned in tents. The teacher divides the students into groups, each group of four students was given to prepare a conical tent of radius 7 m and canvas of area 551 m^2 in which 1 m^2 is used in stitching and wasting of canvas.

a. Curved surface area of conical tent is:

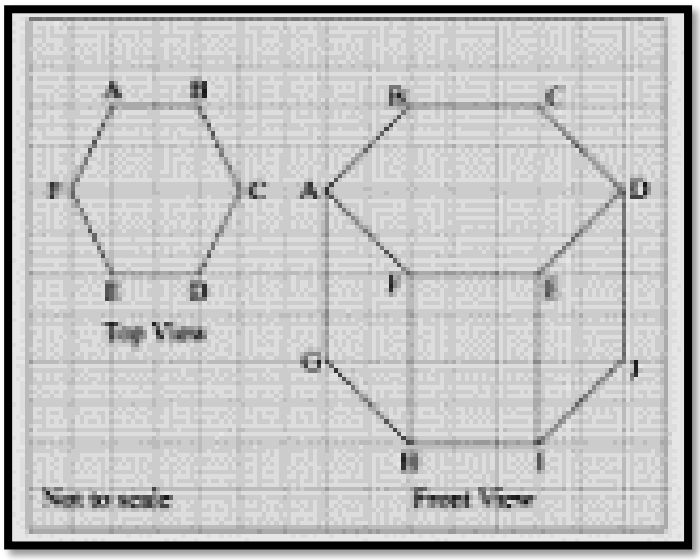
	(i)	πrl	(ii)	$\pi^{r2}h$	(iii)	$\frac{1}{2}\pi rl$	(iv)	$2\pi r(r + l)$

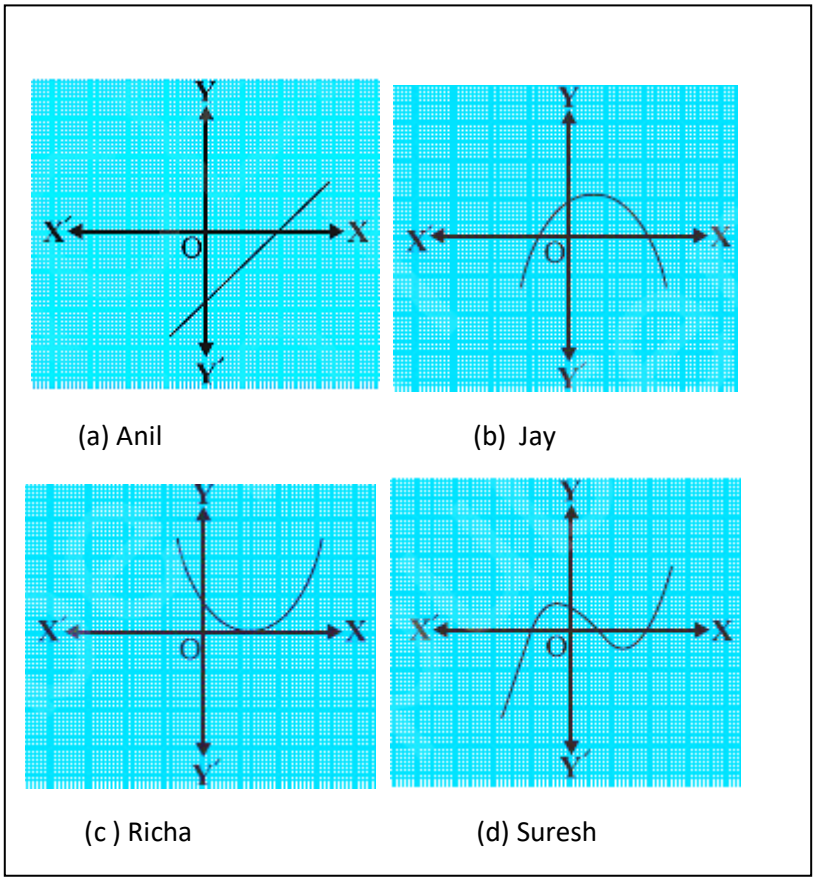
b. Height of the conical tent is:

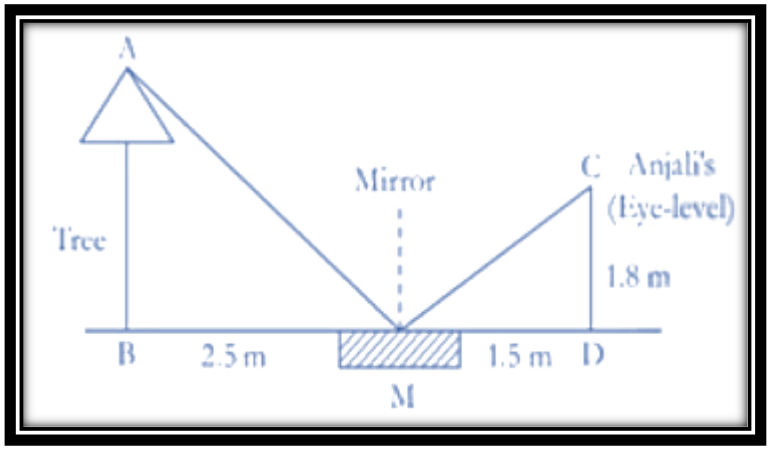
	(i)	24 m	(ii)	25 m	(iii)	26 m	(iv)	27 m

c. Volume of the tent is:

	(i)	1234 m^3	(ii)	1232 m^3	(iii)	1332 m^3	(iv)	1343 m^3

d	How much space is occupied by each student in the tent if there are 4 students in a tent?							
	(i)	318 m^3	(ii)	813 m^3	(iii)	308 m^3	(iv)	391 m^3
e	The cost of canvas for making the tent if the canvas cost ₹ 70 per sq. m is:							
	(i)	₹ 40000	(ii)	₹ 38570	(iii)	₹ 38575	(iv)	₹ 48470
18.	**Case Study Based-2** An aquarium is a transparent tank of water in which the fish and other water creatures and plants are kept. The diagram below shows the plan for an aquarium. It will be built in hexagonal shape. It will be made using • Six rectangular shaped clear glasses. • One rectangular hexagon clear glass for roof.  							
a	Refer to Top View The value of x for which the distance between the points F(2, -3) and C(x, 5) is 10 is:							
	(i)	8 or -4	(ii)	4 or 8	(iii)	5 or -10	(iv)	5 or 10
b	Refer to Top View The midpoint of the line segment joining the points E(8, 11) and B(11, 15) is:							
	(i)	(6, 10)	(ii)	$\left(\frac{11}{5}, \frac{8}{5}\right)$	(iii)	$\left(17, \frac{15}{4}\right)$	(iv)	$\left(\frac{19}{2}, 13\right)$
c	Refer to Front View The distance of a point F(8, 6) from origin is:							
	(i)	12 units	(ii)	16 units	(iii)	14 units	(iv)	10 units

d	Refer to Front view: The perimeter of square EFHI where E(-2, 0), F(3, 0), H(3, 5) and I(-2, 5) is:							
	(i)	$8\sqrt{5}$ units	(ii)	40 units	(iii)	20 units	(iv)	None of these
e	Refer to Front view: The coordinates of the point which divides segment joining the point A(-4, 5) and D(6, 3)in the ratio 3:2 internally is:							
	(i)	(0, 8)	(ii)	$\left(2,\frac{19}{5}\right)$	(iii)	$\left(8,\frac{13}{2}\right)$	(iv)	$\left(\frac{7}{5},3\right)$
19.	**Case Study Based-3** In a class room, four students Anil, Jay, Richa and Suresh were asked to draw the graph of $p(x) = ax^2 + bx + c$. Following graphs were drawn by the students.  (a) Anil (b) Jay (c) Richa (d) Suresh							
a	The number of students who have drawn the graph correctly is:							
	(i)	1	(ii)	2	(iii)	3	(iv)	4

b	The name of the curve represented by Jay's polynomial is:							
	(i)	parabola	(ii)	ellipse	(iii)	hyperbola	(iv)	None of these
c	The number of zeroes for Richa's graph is:							
	(i)	1	(ii)	2	(iii)	3	(iv)	4
d	If $p(x) = ax^2 + bx + c$ and $a + c = b$, then one of the zeroes is:							
	(i)	$\frac{b}{a}$	(ii)	$\frac{c}{a}$	(iii)	$\frac{-b}{a}$	(iv)	$\frac{-c}{a}$
e	If $p(x) = ax^2 + bx + c$ and $a + b + c = 0$, then one of the zeroes is:							
	(i)	$\frac{b}{a}$	(ii)	$\frac{c}{a}$	(iii)	$\frac{-b}{a}$	(iv)	$\frac{-c}{a}$
20.	**Case Study Based-4** Teacher gives an activity to the students to measure the height of a tree and asks them who will do this activity. Anjali accepts the challenge. She places a mirror on level ground to determine the height of the tree. She stands at a certain distance so that she can see the top of the tree reflected from the mirror. Anjali's eye level is 1.8 m above ground. The distance of Anjali and the tree from the mirror are 1.5 m and 2.5 m respectively.  							
a	Refer to the figure and identify the similar triangles:							
	(i)	$\Delta ABM \sim \Delta CDM$	(ii)	$\Delta ABM \sim \Delta CMD$	(iii)	$\Delta ABM \sim \Delta MCD$	(iv)	None of these
b	The similarity criteria applied to prove the similarity of triangles is:							
	(i)	SSS	(ii)	SAS	(iii)	AA	(iv)	None of these
c	The height of the tree is:							
	(i)	3 m	(ii)	3.5 m	(iii)	2.5 m	(iv)	4m

d	In ΔABM if ∠ABM = 30° find ∠MCD.							
	(i)	65°	(ii)	45°	(iii)	40°	(iv)	30°
e	The length of AM is:							
	(i)	$\sqrt{61}\,m$	(ii)	$\frac{\sqrt{61}}{10}$ m	(iii)	$\frac{\sqrt{61}}{2}$ m	(iv)	$\frac{5\sqrt{61}}{100}$ m

PART -B:

Q21 to Q26 are Very Short Answer Questions of 2 marks each

21. If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, $0 < A + B \leq 90°$, $A > B$, then find the values of A and B.

OR

Prove that $\sqrt{\frac{1 - \cos A}{1 + \cos A}} = \operatorname{cosec} A - \cot A$

22. 2 cubes, each of volume 125 cm^3, are joined end to end. Find the surface area of the resulting cuboid.

23. If the point (x, y) is equidistant from the points $(a + b, b - a)$ and $(a - b, a + b)$, prove that $bx = ay$.

OR

If the line segment joining the points A(2, 1) and B(5, –8) is trisected at the points P and Q, find the coordinates of P.

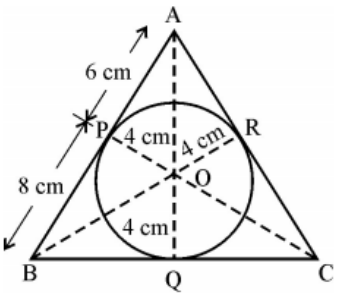
24. A box contains 125 shirts of which 110 are good, 12 have minor defects and 3 have major defects. Ram Lal will buy only those shirts which are good while Naveen will reject only those which have major defects. A shirt is taken out at random from the box. Find the probability that

(i) Ram Lal will buy it

(ii) Naveen will buy it

25. How many terms of the A.P. $-6, \frac{-11}{2}, -5, \frac{-9}{2}$, ... are needed to give their sum zero ?

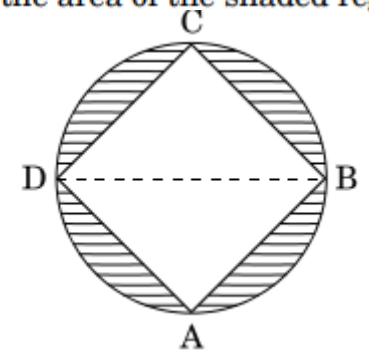
26. In Fig. , the radius of incircle of ΔABC of area 84 cm^2 is 4 cm and the lengths of the segments AP and BP into which side AB is divided by the point of contact are 6 cm and 8 cm. Find the lengths of the sides AC and BC.



PART B:

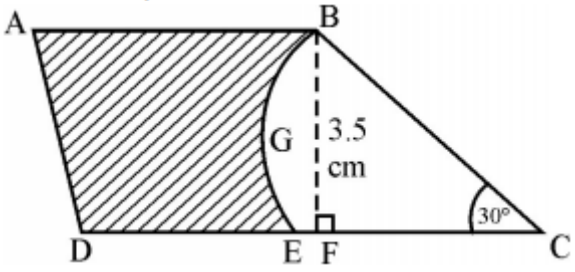
Q27 to Q 33 are Short Answer Questions of 3 marks each

27. In Figure , ABCD is a square with side 7 cm. A circle is drawn circumscribing the square. Find the area of the shaded region.



OR

In Fig. , ABCD is a trapezium with AB || DC and ∠BCD = 30°. If BGEC is a sector of a circle with centre C and AB = BC = 7 cm, DE = 4 cm and BF = 3.5 cm, then find the area of the shaded region (use $\pi = \frac{22}{7}$).



28. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find its 20^{th} term.

29. D and E are points on the sides CA and CB respectively of a triangle ABC right angled at C. Prove that $AE^2 + BD^2 = AB^2 + DE^2$

30. Draw two concentric circles of radii 2 cm and 5 cm. Take a point P on the outer circle and construct a pair of tangents PA and PB to the smaller circle. Measure PA.

31. Solve for x and y :
$99x+101y=499$; $101x+99y=501$

OR

The present age of a father is three years more than three times the age of his son. Three years hence the father's age will be 10 years more than twice the age of the son. Determine their present ages.

32. Solve for x, $12abx^2-(9a^2+8b^2)x+6ab=0$.

33. Find the ratio in which the line $2x+3y=10$ divides the line segment joining the points (1, 2) and (2, 3).

PART B:
Q34 to Q 36 are Long Answer Questions of 5 marks each

34. The median of the following distribution is 30. Find the missing frequencies f_1 and f_2.

Classes	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
Frequency	10	10	f_1	30	f_2	10	100

OR

If the mean of the following frequency distribution is 188, find the missing frequencies f_1 and f_2, if the total of all frequencies is 100 :

Classes	0 – 80	80 – 160	160 – 240	240 – 320	320 – 400
Frequency	20	25	f_1	f_2	10

35. A solid metallic cylinder of diameter 12 cm and height 15 cm is melted and recast into 12 toys in the shape of a right circular cone mounted on a hemisphere of same radius. Find the radius of the hemisphere and total height of the toy, if the height of the cone is 3 times the radius.

36. The angle of elevation of a jet plane from a point A on the ground is 60°. After a flight of 15 seconds, the angle of elevation changes to 30°. If the jet plane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the jet plane.

Answers								
Answers	**1**	$\sqrt[3]{9}$	**2**	3024	**3.**	$\frac{5}{9}$ **OR** 2	**4**	No real roots
	5	2 **OR** $\frac{4}{\sqrt{7}}$	**6**	6 cm	**7**	3:1	**8**	$\frac{2}{3}$ **OR** 0
	9	$2\sqrt{m^2+n^2}$ **OR** 2	**10**	k<-9	**11**	60°	**12**	7
	13	-4	**14**	17 **OR** 5050	**15**	17	**16**	33
	17	a(i) b(i) c(ii)d(iii) e(ii)	**18**	a(i) b(iv) c(iv)d(iii) e(ii)	**19**	a(ii) b(i) c(ii)d(iv) e(ii)	**20**	a(i) b(iii) c(i)d(iv) e(iii)
	21	A $=45^0$, B $=45°$	**22**	250 cm^2	**23**	**OR** P(3,-2) Q(4,-5)	**24**	(i)$\frac{22}{25}$ (ii)$\frac{122}{125}$
	25	25	**26**	16 cm, 14 cm	**27**	259 cm^2 **OR** 18.67 cm^2	**28**	200
	31	x =3, y = 2 **OR** 33yrs,10 yrs	**32**	$\frac{3a}{4b}, \frac{2b}{3a}$	**33**	2:3	**34**	30,10 **OR** 15,30
	35	3 cm, 12 cm	**36**	720 km/hr				