FIRST PRACTICE TEST – 2019-20

Class-X

Subject: Mathematics(STANDARD)

Time allowed: 3 hours **Maximum Marks :80**

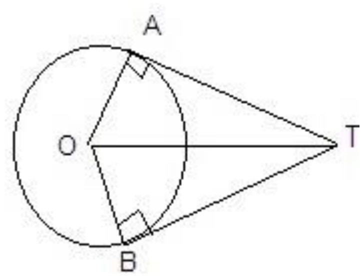
General Instructions:

- **(i) All questions are compulsory.**
- **(ii) The question paper consists of 40 questions divided into four sections - A, B, C and D.**
- **(iii) Section A contains 20 questions of 1 mark each. Section B contains 6 questions of 2 marks each, Section C contains 8 questions of 3 marks each and Section D contains 6 questions of 4 marks each.**
- **(iv) Use of calculators is not permitted.**

Section –A (1x20=20)

1. Find the value of k, so that quadratic equation $2x^2 + kx + 2 = 0$ has two equal roots.
(a)16 (b) 4 (c) 8 (d)2

2. In figure, if $\angle ATO = 40°$, Find $\angle AOB$.



(a) 40 ° (b) 100 ° (c) 120 ° (d) 90 °

3. A ladder, leaning against a wall, makes an angle of 60° the horizontal. If the foot of the ladder is 2.5 m away from the wall, find the length of the ladder.
(a) 8m (b) 3m (c) 5m (d)2.5m

4. If $\pi = \frac{22}{7}$, the distance covered by a wheel of diameter 35cm in one revolution is
(a) 100 cm (b) 1.1 cm (c)17.5 cm (d)110 cm

5. The area of circle inscribed in a square of side a is
(a) $\pi a^2/4$ (b) $\pi a^2 / 2$ (c) πa^2 (d) $\pi a^2/3$

6. The value of k for which the pair of linear equation4x+6y-1=0 and 2x-ky=7 represent parallel line is
(a) -8 (b) -3 (c) -9 (d)-7

7. If $x = a\cos\theta$ $y = a\sin\theta$ then x^2+y^2
(a) a (b) a^3 (c) a^2 (d)1

8. If area of circle is numerically equal to twice the circumference, then the diameter of the circle is
(a) 16 (b)2 (c) 8 (d)4

9. $9(\sec A)^2 - 9(\tan A)^2 = ?$
(a) 9 (b) 18 (c) 1 (d)1/9

10. Find the coordinate of the midpoint of the line segment joining the points A (-5,4) and B (7,-8)
(a) (2,-1) (b) (1,-2) (c) (-1,-2) (d) (3,-1)

11. The HCF and LCM of the two numbers are 9 and 360 respectively. If one number is 45 then other number is
(a) 9 (b) 18 (c) 72 (d)36

12. What is the LCM of smallest prime no. and smallest composite no,
(a) 1 (b) 2 (c) 3 (d)4

13. If α and β are the zeroes of the polynomial $P(x)=x^2-x-4$ then $\alpha+\beta-\alpha\beta =$
(a)5 (b) 4 (c) 15 (d)-5

14. In an AP if the common difference is-4 and seventh term is 4 then first term is
(a)2 (b) 28 (c) 5 (d)7

15. What is the value of $\cos^2 67 - \sin^2 23$
(a) 67 (b) 25 (c) 0 (d)1

16. Given ΔABC is similar to Δ PQR if $\frac{AB}{PQ} = \frac{1}{3}$ then find $\frac{ar(\Delta ABC)}{ar(\Delta pqr)}$
(a)1/16 (b) 1/10 (c) - 1/9 (d)1/9

17. $\frac{2\tan 30^\circ}{1+\tan 30^\circ X \tan 30^\circ} =$
(a) sin 60 (b) tan 30 (c) tan 45 (d) sin 30

18. If 197a+173b=221 and 173a+197b=149 then (a,b) is
(a) (3,-2) (b) (2,-1) (c) (1.-2) (d)(2,1)

19. Area of sector of angle p (in degrees) of a circle with radius R is
(a) $\frac{p}{180}$ X2πR (b) $\frac{p}{180}$ XπR^2 (c) $\frac{p}{720}$ X2πR^2 (d) $\frac{p}{360}$ X2ΠR^2

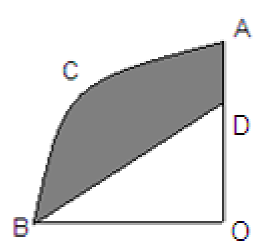
20. The common point of a tangent to a circle and the circle is called ------------

Section –B (6x2=12)

21.Δ ABC is an isosceles triangle, right angled at C prove that $AB^2=2AC^2$

22. Find two numbers whose sum is 27 and product is 182.

23. OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the
(i) quadrant OACB
(ii) shaded region



24. Find the 20th term from the last term of the AP: 3, 8, 13,,…………….253.

25. Find the values of y for which the distance between them the points P (2, -3) and Q (10, y) is 10 units.

26 If the points (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

Section –C(3x8=24)

27 Determine the AP whose 5^{th} term is 15 and sum of 3^{rd} and 8^{th} term is 34.

28. Prove that $3+2\sqrt{7}$ is irrational number

29 Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

30. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find :

(i) the length of the arc
(ii) area of sector formed by the arc
(iii) area of the segment formed by the corresponding chord

31. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower.

32. Solve for x: $\frac{x+2}{x-2}+\frac{x-4}{x+4}=6 \quad (x \neq 2, -4)$

33. Prove that.

$$(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$$

34. Find the ratio in which the line segment joining A (1, -5) and B (-4, 5) is divided by the x-axis. Also find the coordinates of the point of division.

Section –D(4x6=24)

35. Two water tapes together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

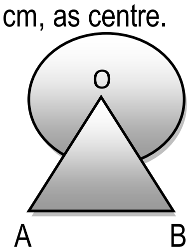
36. The angle of elevation of an aeroplane from a point on the ground is 60° . After a flight of 30 second the angle of elevation becomes 30°. If the aeroplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the aeroplane.

37. In an equilateral triangle ABC, D is a point on side BC such that BD = $\frac{1}{3}$ BC. Prove that $9\ AD^2 = 7\ AB^2$.

or

State and prove converse of Pythagoras theorem

38. Find the area of shaded region in figure, where a circular arc of radius 7 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm, as centre.



39. Draw a triangle ABC with side BC = 7 cm, ∠B =45° ∠ A = 105° . Then construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of ΔABC. (Also write steps of construction)

40. Find all other zeros of $3x^4+6x^3-2x^2-10x-5$, if two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$

QUESTION PAPER : MATHEMATICS
CLASS – X
MARKING SCHEME

Section-A

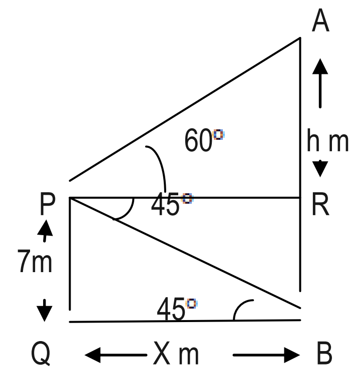
QUESTION NUMBER	ANSWERS	VALUE POINTS
1	a	1
2	b	1
3	c	1
4	d	1
5	a	1
6	b	1
7	c	1
8	d	1
9	a	1
10	b	1
11	c	1
12	d	1
13	a	1
14	b	1
15	c	1
16	d	1
17	a	1
18	b	1
19	c	1
20	point of contact	1

Section-B

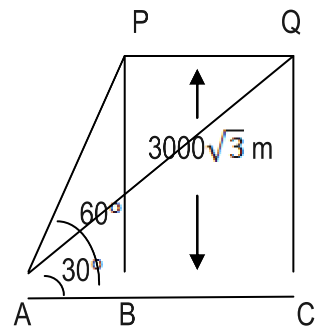
QUESTION NUMBER	EXPECTED ANSWERS	VALUE POINTS
21	**GIVEN** **TO PROVE** **PROOF**	**1** **1**
22	Let the numbers are x and 27 – x. X .(27 –x) =182 X = 13 , 14 Numbers are **13** & **14**	 (1) (1)
23	(i)Area of quadrant OACB = $\frac{1}{4}\pi r^2$ $= \frac{1}{4} \times \frac{22}{7} \times (3.5)^2 = \frac{77}{8} = \mathbf{9\frac{5}{8}\ cm^2}$ (ii) Area of ΔOBD = $\frac{1}{2} \times 3.5 \times 2 = \frac{7}{2}$ cm^2 Area of shaded region =area of quadrant OACB – Area of ΔOBD $= \frac{77}{8} - \frac{7}{2} = \mathbf{6\frac{1}{8}\ cm^2}$	½ ½ ½ ½
24	formula correct calculation	**1** **1**
25	formula correct calculation	**1** **1**
26	formula correct calculation	**1** **1**

QUESTION NUMBER	EXPECTED ANSWERS SECTION C	VALUE POINTS
27	$T_5 = 15 \Rightarrow a + 4d = 15$ ……………..(1) $T_3 + T_8 = 34 \Rightarrow (a + 2d) + (a + 7d) = 34$ $2a + 9d = 34$ ……………(2) Solving eq. (1) and (2) we get a = -1 and d= 4 **So -1, 3, 7, …….are in AP**	(1) (1) (1)
28	**given** **to prove** **proof**	 **1** **2**
29	For Given, To prove and figure For correct proof	1½ 1½
30	(i) Length of arc = $\frac{60°}{360°} \times 2\pi \times 21 = \mathbf{22\ cm}$ (ii) Area of sector = $\frac{60°}{360°} \times \pi \times (21)^2 = \mathbf{231\ cm^2}$	(1) (1) (1)

	Area of segment = Area of sector – area of eq. triangle = **40.27 cm²**	

31	For figure In ΔAPR, we have tan 60° = $\frac{AR}{PR}$ $\sqrt{3} = \frac{h}{x}$ => h = $\sqrt{3}$ x ……..(I) In ΔPBQ, we have tan 45° = $\frac{PQ}{QB}$ 1 = $\frac{7}{x}$ => x = 7…………….(II By solving (I) and (II) we get h =7$\sqrt{3}$ i.e. AR = 7$\sqrt{3}$ m Height of the tower AB = **7($\sqrt{3}$ +1)m**  	(1) (1) ½ ½
32	$\frac{x+2}{x-2} + \frac{x-4}{x+4} = 6$ (x + 2)(x +4) + (x – 4)(x – 2) = 6(x – 2)(x +4) After solving above eq. we get $x^2 + 3x - 16 = 0$ X = $\frac{-b \pm \sqrt{D}}{2a}$ = $\frac{-3 \pm \sqrt{73}}{2}$	½ 1 1½
33	Using identity Correct Proof	½ 2½
34	Let the required ratio be k : 1 .Then, the coordinate of the point of division is P($\frac{-4k+1}{k+1}$, $\frac{5k-5}{k+1}$) Since the point lies on x-axis. There its y-coordinate is zero. $\frac{5k-5}{k+1}$ = 0 => k =1 So **ratio = 1: 1** **Coordinate of point of division = P(-$\frac{3}{2}$, 0)**	(1) (1) (1)
QUESTION NUMBER	**EXPECTED ANSWERS SECTION C**	**VALUE POINTS**
35	Let the smaller tap fill the tank in x hours. Then larger tap fills the tank in (x-10) hours Part of tank filled by smaller tap in 1 hour =$\frac{1}{x}$ Part of the tank filled by the larger tap in 1 hour = $\frac{1}{x-10}$ Part of the tank filled by both taps together in 1 hour =$\frac{8}{75}$ A/Q $\frac{1}{x} + \frac{1}{x-10} = \frac{8}{75}$ and after solving we get $4x^2 - 115x + 375 = 0$ (x-25)(4x-15) =0 => x =25 or x= $\frac{15}{4}$ Now x = $\frac{15}{4}$ => x-10 < 0 so x = 25 Hence ,the time taken by smaller tap to fill the tank = **25 h**	(1) (1) (1) (1)

	& the time taken by larger tap to fill the tank = **15 h**	

36	For figure In ΔABP, we have tan 60° $= \frac{BP}{AB}$ $\sqrt{3} = \frac{3000\sqrt{3}}{AB}$ => AB = 3000 m In ΔACQ tan 30° $= \frac{CQ}{AC}$ $\frac{1}{\sqrt{3}} = \frac{3000\sqrt{3}}{AC}$ => AC = 9000 m So distance BC = AC – AB = 6000 m Speed of plane = 720 km/h. 	(1) (1) (1) (1)
37	For Given, To prove figure For correct proof	**1** **1** **2**
38	Area of the shaded region = (area of circle – area of sector of central angle 60°) + area of equilateral triangle OAB $=\left[\left\{\pi r^2 - \frac{\theta°}{360°}\pi r^2\right\} + \frac{\sqrt{3}}{4}\ (side)^2\right]$ $= \left[\left\{\frac{22}{7}\ (7)^2 - \frac{60°}{360°}\ x\ \frac{22}{7} x (7)^2\right\} + \frac{\sqrt{3}}{4}\ (12)^2\right]$ **= 190.68 cm²**	(1) (1) (1) (1)
39	For construction of ΔABC Construction of triangle whose sides are $\frac{4}{3}$ times the corresponding sides of ΔABC For steps of construction	(1) (2) (1)
40	x^2+2x+1 zeroes x=-1 x=-1	**1** **1** **2**