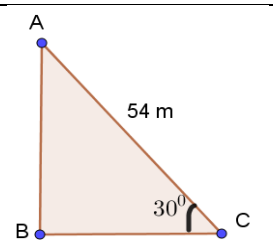
SAMPLE QUESTION PAPER (2020-21)

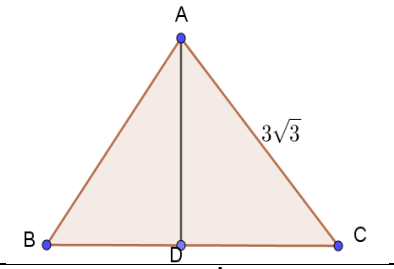
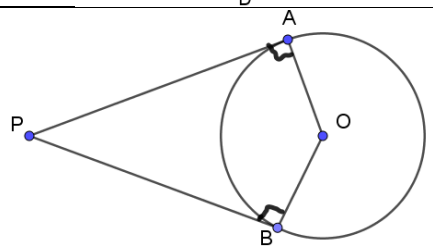
CLASS X

MATHEMAICS – BASIC

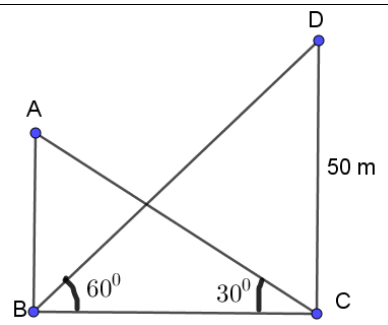
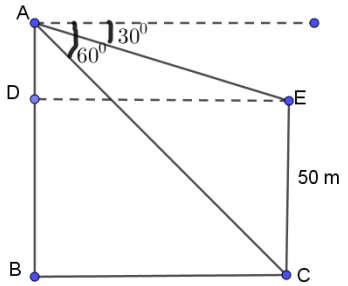
MARKING SCHEME

Q. No	Solutions	Marks
1.	429 = 3 x 13 x 11	1
2.	k = 2	1
3.	HCF (65,117) = 13 m = 2 OR LCM = 9696	½ ½ 1
4.	$\frac{2}{m-1} = \frac{3}{m+1} = \frac{7}{3m-1}$ m = 5	½ ½
5.	Four decimal places	1
6.	TSA = $3\pi r^2$ OR V = $\frac{4}{3}\pi r^3$ V' = $\frac{1}{8}$ V	1 ½ ½
7.	$\frac{x}{x-2} = \frac{x+2}{x-1}$ x = 4 OR $\angle AED = 60^0$ $\angle BCA = \angle AED = 60^0$	½ ½ ½ ½
8.	Tan $30^0 = \frac{BC}{BA} = \frac{1}{\sqrt{3}}$ AB = 10√3 Perimeter = 2(10 + 10√3) = 20(1 +√3)	½ ½
9.	sin $30^0 = \frac{AB}{AC}$ = ½ AB = 27 m 	½ ½
10.	$2\pi r = \pi r^2$ r = 2 units	½ ½
11.	$X_1 + x_2 + x_3 + x_4 + x_5 = 135$ $X_1 + x_2 + x_3 + x_4 = 100$ $X_5 = 35$	½ ½
12.	Minimum number of points = 9	1

13.	$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ Parallel lines OR x = 39 y = 13	½ ½
14.	Let the no of lottery tickets purchased =x $\frac{x}{6000} = 0.08$ x = 480 OR P(having same birthday) = 1 – P(not having same birthday) = 1 – 0.992 = 0.008	½ ½
15.	30^0	1
16.	Total letters = 26 Consonants = 21 P(Consonants) = $\frac{21}{26}$	½ ½
17.	(i) (b) (ii) (a) (iii) (b) (iv) (d) (v) (b)	1 x 4 = 4
18.	(i) (a) (ii) (a) (iii) (b) (iv) (d) (v) (c)	1 x 4 = 4
19.	(i) (a) (ii) (a) (iii) (b) (iv) (d) (v) (b)	1 x 4 = 4
20.	(i) (d) (ii) (a) (iii) (c) (iv) (c) (v) (c)	1 x 4 = 4
21.	x = $\frac{1(4)+3(8)}{4} = 7$ y = $\frac{1(-3)+3(5)}{4}$ = 3 (x,y) = (7,3) OR $\sqrt{(3-x)^2 + (6-y)^2} = \sqrt{(-3-x)^2 + (4-y)^2}$	½ ½ 1 1

	$9 + x^2 - 6x + 36 + y^2 - 12y = 9 + x^2 + 6x + 16 + y^2 - 8y$ $3x + y = 5$	½ + ½
22.	DC = $\frac{3}{2}\sqrt{3}$ $AD^2 + DC^2 = AC^2$ AD = 9/2 cm  	½ ½ 1
23.	$\angle PAO = \angle PBO = 90^0$ ⇨ $\angle PAO + \angle PBO = 180^0$ ⇨ $\angle APO + \angle AOB = 360^0 - 180^0$ $= 180^0$ ⇨ Sum of opp angles is 180^0  ⇨ $AOPB$ *is a cyclic quadrilateral*	½ ½ ½ ½
24.	Construction of tangents on circle	½ +1 ½
25.	Tanθ = $\frac{4}{5}$ $\frac{\sin\theta}{\cos\theta} = \frac{4}{5}$ 5sin θ = 4 cos θ $\frac{5\sin\theta - 4\cos\theta}{5\sin\theta + 4\cos\theta} = 0$ OR Sin θ = $\frac{12}{13} = \frac{P}{H}$ B = 5 sec θ = $\frac{13}{5}$, $\tan\theta = \frac{12}{5}$ $\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta} = 25$	½ ½ ½ ½ ½ ½ ½ ½
26.	14,21,28,35,...98 are in A.P First term=a=14 and common difference=d=21−14=7 and the last term=tn tn =98 =a+(n−1)d ⇒98=14+(n−1)7 ⇒98=14+7n−7 ⇒7n=98−7 ⇒7n=91 n=13 There are 13 numbers divisible by 7	½ ½ ½ ½
27.	Given √3 is irrational number Let 2+√3 is rational number. then 2+√3= $\frac{p}{q}$, where p & q are coprime integers, q ≠ 0 √3 = $\frac{p-2q}{q}$	½ ½ ½ ½

	Since √3 is irrational number but $\frac{p-2q}{q}$ is rational it means We reach a contradiction ∴ our assumption is wrong and 2+√3 is irrational number.	½ ½
28.	$\angle OPR$ = 90^0 $\angle OPQ$ = 40^0 $\angle OPQ = \angle OQP$ = 40^0 (angles opp to radii) $\angle POQ$ = $180^0 - 80^0 = 100^0$	½ ½ 1 1
29.	Let the numbers be x and y $\frac{x}{y} = \frac{5}{6}$ 6x – 5y = 0 $\frac{x-8}{y-8} = \frac{4}{5}$ 5x – 4y = 8 On solving we get x = 40 Y = 48	 1 1 1
30.	n (possible outcomes) = 36 n (favourable outcome) = 30 P (getting different numbers on dice) = $\frac{30}{36} = \frac{5}{6}$ OR n (possible outcomes) = 29 a) P (Prime Number) = $\frac{6}{29}$ b) P (divisible by 7) = $\frac{4}{29}$	1 1 1 1 1 1
31.	side of the cube (a)= 7 cm Maximum diameter of the hemisphere = 7 cm Radius = 7/2 cm TSA = $6a^2 - \pi r^2 + 2\pi r^2 = 6a^2 + \pi r^2$ TSA = $6(7)(7) + \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2}$ TSA = $294 + 11 \times \frac{7}{2}$ TSA = 294 + 38.5 = 332.5 cm^2	 ½ 1 1 ½
32.	LHS: $\sin^2 A + \text{cosec}^2 A + 2\sin A \text{ cosec } A + \cos^2 A + \sec^2 A + 2\cos A \sec A$ $= \sin^2 A + \text{cosec}^2 A + 2 \sin A (\frac{1}{\sin A}) + \cos^2 A + \sec^2 A + 2 \cos A (\frac{1}{\text{Cos } A})$ $= \sin^2 A + \text{cosec}^2 A + 2 + \cos^2 A + \sec^2 A + 2$ $= 1 + 2 + 2 + \text{cosec}^2 A + \sec^2 A$ $= 5 + \cot^2 A + 1 + 1 + \tan^2 A$ $= 7 + \tan^2 A + \cot^2 A$ = RHS	1 1 1
33.	$D = b^2 - 4ac = 80 > 0$	1

	$x = \frac{-b \pm \sqrt{D}}{2a}$ x = -1 - √5 & -1 + √5 OR Two consecutive odd numbers = 2x + 1, 2x + 3 $(2x + 1)^2 + (2x + 3)^2 = 394$ $x^2 + 2x - 48 = 0$ $x^2 + 8x - 6x - 48 = 0$ x (x + 8) – 6 (x + 8) = 0 x = -8, 6 x = 6 Odd numbers are 13 & 15	1 1 ½ ½ 1 1
34.	In $\Delta\, DBC$ $\frac{DC}{BC} = tan60^0 = \sqrt{3}$ BC = $\frac{50\sqrt{3}}{3}$ In $\Delta\, ABC$ $\frac{AB}{BC} = tan30^0 = \frac{1}{\sqrt{3}}$ BC = $\frac{50}{3}$ m = 16.67 m  OR Let AD = x EC = DB = 50 m BC = DE In $\Delta\, ABC$ $\frac{AB}{BC} = tan60^0 = \sqrt{3}$ BC = $\frac{50 + x}{\sqrt{3}}$ In $\Delta\, ADE$ $\frac{AD}{DE} = tan30^0 = \frac{1}{\sqrt{3}}$  DE = x√3 DE = BC x = 25 Height of the tower = 75 m Distance = 25√3	Figure – 1 1 1 1 1 Figure – 1 1 1 1
35.	Let A be the first term and D the common difference of A.P. Tp=a=A+(p−1)D=(A−D)+pD (1) Tq=b=A+(q−1)D=(A−D)+qD ..(2) Tr=c=A+(r−1)D=(A−D)+rD ..(3) Here we have got two unknowns A and D which are to be eliminated. We multiply (1),(2) and (3) by q−r, r−p and p−q respectively and add: a (q-r) = (A – D)(q-r) + D p(q-r) b(r-p) = (A-D) (r-p) + Dq (r-p) c(p-q) = (A-D) (p-q) + Dr (p-q)	½ ½ ½ ½ ½ ½

<table>
<tr><td></td><td>a(q−r)+b(r−p)+c(p−q)
=(A−D)[q−r+r−p+p−q]+D[p(q−r)+q(r−p)+r(p−q)]
= (A – D) (0) + D [pq-pr + qr – pq + rp – rq)
=0</td><td>1
1</td></tr>
<tr><td>36.</td><td>
<table>
<tr><th>Class Interval</th><th>Frequency</th><th>Cf</th></tr>
<tr><td>117.5 – 126.5</td><td>3</td><td>3</td></tr>
<tr><td>126.5 – 135.5</td><td>5</td><td>8</td></tr>
<tr><td>135.5 – 144.5</td><td>9</td><td>17</td></tr>
<tr><td>144.5 – 153.5</td><td>12</td><td>29</td></tr>
<tr><td>153.5 – 162.5</td><td>5</td><td>34</td></tr>
<tr><td>162.5 – 171.5</td><td>4</td><td>38</td></tr>
<tr><td>171.5 – 180.5</td><td>2</td><td>40</td></tr>
<tr><td>Total</td><td>40</td><td></td></tr>
</table>
n/2 = 40/2 = 20
Median Class = 144.5 – 153.5
Median = l + [$\frac{\frac{n}{2} - cf}{f}$] h
l = 144.5; cf = 17;f = 12; h = 153.5 – 144.5 = 9
Median = 144.5 + [$\frac{20 - 17}{12}$] 9
146.75
</td><td>Table = 1

1

1
1
1</td></tr>
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