COMMON PRE-BOARD EXAMINATION

SUBJECT: MATHEMATICS (STANDARD) (041)

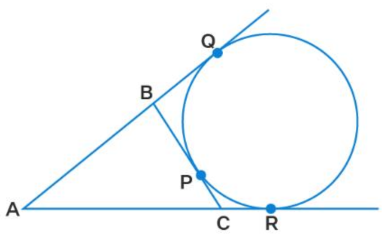
CLASS: X – SESSION 2022-23

MARKING SCHEME

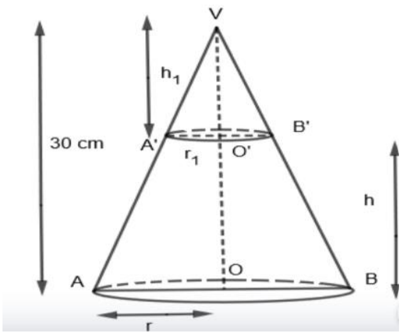
	SECTION A	
Q. No		**Marks**
1	(b) 150	1
2	(c) ± 7	1
3	(a) 4 - 4x - x^2 + x^3	1
4	(a) Infinitely many solutions	1
5	(a) 2 units	1
6	(d) 3.6	1
7	(d) 30°	1
8	(c) $\frac{4}{3}$	1
9	(b) ∠B = ∠D	1
10	(a) similar but not congruent	1
11	(b) 11 cm	1
12	(d) 16:81	1
13	(d) 125%	1
14	(a) 3	1
15	(d) 9π cm^2	1
16	(b) 13 th	1
17	(a) 0.999	1
18	(c) $\frac{\sqrt{3}+1}{2\sqrt{2}}$	1
19	(c) Assertion (A) is true but Reason (R) is false.	1
20	(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1
	SECTION B	
21	$\frac{a1}{a2} \neq \frac{b1}{b2}$ is the condition for the given pair of equations to have unique solution. $\frac{4}{2} \neq \frac{p}{2}$ p ≠ 4 Therefore, for all values of *p*, except 4, the given pair of equations will have a unique solution.	½ ½ ½ ½
22	ΔAOB ~ Δ COD (AA criterion) So, $\frac{AO}{CO} = \frac{OB}{OD}$ (corresponding sides)	1 1

23	The tangents drawn from an external point to the circle are always equal in length. TP = TQ TA + AP = TB + BQ --- eq 1 AP = AR --- eq 2 BQ = BR --- eq 3 Substituting the value of AP and BQ from equation 1, 2, and 3, - TA + AR = TB + BR	½ ½ ½ ½
24	$\operatorname{cosec}^2\theta = (1+\cot^2\theta) = (1+5) = 6, \sec^2\theta = (1+\tan^2\theta) = \left(1+\frac{1}{5}\right) = \frac{6}{5}.$ $\therefore \frac{(\operatorname{cosec}^2\theta - \sec^2\theta)}{(\operatorname{cosec}^2\theta + \sec^2\theta)} = \frac{\left(6-\frac{6}{5}\right)}{\left(6+\frac{6}{5}\right)} = \frac{24}{36} = \frac{2}{3}.$ **OR** $\theta = 45°$ $\sin^4\theta + \cos^4\theta = \sin^4 45° + \cos^4 45°$ $= \left(\frac{1}{\sqrt{2}}\right)^4 + \left(\frac{1}{\sqrt{2}}\right)^4$ $= \frac{1}{4} + \frac{1}{4}$ $= \frac{2}{4} = \frac{1}{2}$	1 1 ½ ½ ½ ½
25	In 35 minutes, minute hand revolves = 6° × 35 = 210° Area = $\pi r^2 \times \theta/360°$ = 11(25)/6 = 45.83 cm^2 **OR** $54\pi = \pi(36)^2 \times \theta/360°$ θ = 540/36 = = 15° length of arc = $\theta/360° \times 2\pi r = 3\pi$	½ 1 ½ ½ ½ 1

	SECTION C	
26.	2053-5=2048 967-7=960 So the required number= HCF of 2048 and 960. 2048 = 2^{11} 960 = 2^6 x 3 x 5 HCF = 64	 ½ ½ 1 1
27.	α+β=-b/a 7β+β=-(-8)/3 β=1/3 αβ=c/a 7β×β=2k+1/3 7×1/3×1/3=2k+1/3 k = 2/3	½ ½ ½ ½ ½ ½
28.	$\frac{1}{(a+b+x)} - \frac{1}{x} = \frac{1}{a} + \frac{1}{b}$ $\frac{x-(a+b+x)}{(a+b+x)x} = \frac{1}{a} + \frac{1}{b}$ $\frac{x-a-b-x}{(a+b+x)x} = \frac{b+a}{ab}$ $\frac{-(a+b)}{(a+b+x)x} = \frac{(a+b)}{ab}$ $\frac{-1}{(a+b+x)x} = \frac{1}{ab}$ $-ab = x(a+b+x)$ $-ab = x(a+b) + x^2$ $0 = x^2 + x(a+b) + ab$ $x^2 + x(a+b) + ab = 0$ x = -b, x = -a **OR** Let $\frac{2x-1}{x+3}$ = m ∴ $2m$ - $\frac{3}{m}$ = 5 On solving m = 3, $\frac{-1}{2}$; x = -10, $\frac{-1}{5}$	1 1 1 1 1+1

29.	L.H.S = √(1+sinθ/1-sinθ) + √(1-sinθ/1+sinθ) $= \sqrt{\frac{(1+\sin\theta)}{(1-\sin\theta)} \times \frac{(1+\sin\theta)}{(1+\sin\theta)}} + \sqrt{\frac{(1-\sin\theta)}{(1+\sin\theta)} \times \frac{(1-\sin\theta)}{(1-\sin\theta)}}$ $= \sqrt{\frac{(1+\sin\theta)^2}{1-\sin^2\theta}} + \sqrt{\frac{(1-\sin\theta)^2}{1-\sin^2\theta}}$ $= \sqrt{\frac{(1+\sin\theta)^2}{\cos^2\theta}} + \sqrt{\frac{(1-\sin\theta)^2}{\cos^2\theta}}$ $= \frac{1+\sin\theta}{\cos\theta} + \frac{1-\sin\theta}{\cos\theta}$ $= \frac{1+\sin\theta+1-\sin\theta}{\cos\theta}$ $= \frac{2}{\cos\theta}$ $= 2\sec\theta =$ R.H.S.	1 1 1
30.	We know that the tangents drawn through an external point to a circle are equal. So, BP = BQ --------------- (1) CP = CR -------------------- (2) AQ = AR -------------------- (3)  **Fig – 1m** So, AB + BC + AC = AB + (BP + PC) + AC = AB + (BQ+ CR) + AC = AQ + AR = 2 AQ $\therefore AQ = \frac{1}{2}$ perimeter of Δ ABC **OR** Given, to prove that and figure Proof	1 1 1 1 2
31	n(S) = 36 (i) $\frac{1}{9}$ (ii) $\frac{1}{4}$	1 1 1

	SECTION D	
32	Let marks in Mathematics be x. and marks in Science be 32 - x. <u>According to the Question,</u> $\Rightarrow$ (32 - x - 2)(x + 4) = 253 $\Rightarrow$ (30 - x)(x + 4) = 253 $\Rightarrow$ $26x - x^2 + 120 = 253$ $\Rightarrow$ $x^2 - 26x + 133 = 0$ $\Rightarrow$ $x^2 - 19x - 7x + 133 = 0$ $\Rightarrow$ x(x - 19) - 7(x - 19) = 0 $\Rightarrow$ (x - 19) (x - 7) = 0 $\Rightarrow$ x = 19, 7 If x = 19, then, Marks in Mathematics = x = 19 Marks in Science = 32 - x = 13 If x = 7, then, Marks in Mathematics = x = 7 Marks in Science = 32 - x = 25 **OR** $360 = s \times t$ $(s + 5) \times (t - 1) = 360$ st - s + 5t - 5 = 360 360 - s + 5(360/s) - 5 = 360 - s + 1800/s - 5 = 0 $- s^2 + 1800 - 5s = 0$ $s^2 + 5s - 1800 = 0$ s = 40 and s = - 45 Speed of the train cannot be a negative value. Therefore, speed of the train is 40 km /hr.	1 1 1 1 1 1 1 1 1 1
33	Given, to prove that and figure and construction Proof	2 3

34	Diameter of the Gulab jamun, d = 2.8 cm Radius = 1.4 cm Length of cylindrical part, h = 5 cm - 2 × 1.4 cm = 2.2 cm Volume of one Gulab jamun = $\pi r^2 h + 2 \times 2/3\ \pi r^3$ = 22/7 × 1.4 cm × 1.4 cm × (2.2 cm + (4/3) × 1.4 cm) = 75.152/3 cm^3 Volume of 45 Gulab jamuns = 45 × volume of one Gulab jamun = 1127.28 cm^3 Volume of sugar syrup in 45 Gulab jamuns = 30/100 × 1127.28 = = 338.184	 1 1 1 1 1
	OR	
		Figure 2
	h1+h=30 We know that the volume of the smaller cone is $\left(\frac{1}{27}\right)$ of the larger cone. So, we get, $\frac{\pi r_1^2 h_1}{3} = \frac{1}{27}(10\pi r^2)$ On simplifying further, we get, $r_1^2 h_1 = \frac{10}{9} r^2$ $\frac{9h_1}{10} = \frac{r^2}{r_1^2}$ As the base of the smaller cone whose base was cut parallel to that of the larger cone, then we can say that they are similar to each other. Then we can say, $\frac{r_1}{r} = \frac{h_1}{h+h_1}$	 1 1

<table>
<tr><td></td><td>$\frac{r}{r_1} = \frac{30}{h_1}$
As we know that
$\frac{9h_1}{10} = \frac{r^2}{r_1^2}$
So, we can substitute $\frac{r}{r_1} = \frac{30}{h_1}$
So, we get,
$\frac{9h_1}{10} = \frac{900}{h_1^2}$
h_1 = 10, h = 20</td><td>1</td></tr>
<tr><td>35</td><td><table><tr><td>C.I</td><td>f</td></tr><tr><td>0-10</td><td>7</td></tr><tr><td>10-20</td><td>14</td></tr><tr><td>20-30</td><td>13</td></tr><tr><td>30-40</td><td>12</td></tr><tr><td>40-50</td><td>20</td></tr><tr><td>50-60</td><td>11</td></tr><tr><td>60-70</td><td>15</td></tr><tr><td>70-80</td><td>8</td></tr></table>Modal class = 40 to 50
f = 20, l = 40, h=10, f_1= 20, f_2= 20, f_0= 20
Mode = 44.7</td><td>Table
$1\frac{1}{2}$

½
$1\frac{1}{2}$
$1\frac{1}{2}$</td></tr>
<tr><td></td><td>SECTION E</td><td></td></tr>
<tr><td>36</td><td>(i) Amount paid by him in 30th instalment = 3900
(ii) Amount paid in the last instalment = 4900
(iii) Amount paid by him in the 30 instalments = 73500
OR
Ratio of the 1st instalment to the last instalment = 10:49</td><td>1
1

2</td></tr>
<tr><td>37</td><td>(i) Location of exit gate ‘Q’ = (1,3)
(ii) Ratio = 1:1
(iii) Distance between two exit gates P and Q = 4
OR
Distance between O and P = 2</td><td>1
1
2</td></tr>
<tr><td>38</td><td>(i) CD = 75
(ii) BD = $75\sqrt{3}$
(ii) Distance between the two ships = $75\sqrt{3} - 75 = 75(\sqrt{3} - 1)$
OR
Distance between the two ships if the ships were on either side of the lighthouse = $75+75\sqrt{3} = 75(\sqrt{3} + 1)$</td><td>1
1

2</td></tr>
</table>