

MARKING KEY
CLASS 10
FINAL TERM EXAM – MATHEMATICS (STANDARD)
24-11-2022

	SETA		SETB		SETC	
1.	b)4	1.	c) no solutions	1.	c)24	
2.	b)54	2.	a)40	2.	c)16/5	
3	b) $x^2 + 6x - 4 = 0$	3	a)4	3	c)400	
4	c) 1/6	4	c)400	4	b)14	
5	c) no solutions	5	b)14	5	a)4	
6	a)40	6	b)3	6	b)4	
7	b)3	7	c)24	7	a)(2,5)	
8	c)400	8	c)5	8	b)3/4	
9	c)24	9	b)3/4	9	b) 31	
10	a)(2,5)	10	c)1/5	10	c) 1/6	
11	c)16/5	11	b) 31	11	b) $x^2 + 6x - 4 = 0$	
12	a)4	12	b)54	12	b)3	
13	c)5	13	d)35	13	c)5	
14	d)35	14	a)(2,5)	14	c) no solutions	
15	b)3/4	15	b) $x^2 + 6x - 4 = 0$	15	c)1/5	
16	b)31	16	c) 1/6	16	a)40	
17	b)14	17	c)16/5	17	b)54	
18	c)1/5	18	b)4	18	d)35	
19	d	19	d	19	D	
20	d	20	d	20	d	

21	Let, the zero of $2x^2 + 3x + \lambda$ be $\frac{1}{2}$ and β .	
	Product of zeroes $\frac{c}{a}$, $\frac{1}{2}\beta = \frac{\lambda}{2}$	½
	or, $\beta = \lambda$	
	and sum of zeroes $-\frac{b}{a}$, $\frac{1}{2} + \beta = -\frac{3}{2}$	½
	or $\beta = -\frac{3}{2} - \frac{1}{2} = -2$	½
	Hence $\lambda = \beta = -2$	½
	Thus other zero is -2 .	
	OR	
	$px(x - 3) + 9 = 0$ or $px^2 - 3px + 9 = 0$	½
	Let α, β be the zeroes of the polynomial.	
	Then, $\alpha + \beta = 3$ and $\alpha\beta = \frac{9}{p}$	½
	Also $\alpha = \beta$	
	$\therefore 2\alpha = 3$	½
	or $\alpha = \beta = \frac{3}{2}$	½
	$\frac{9}{4} = \frac{9}{p}$	½
	$\Rightarrow p = 4$	
	According to the question	

27	<p>i.e., $b^2 - 4ac = 0 \dots(2)$</p> <p>Comparing the given equation with $ax^2 + bx + c = 0$ we get $a = 1$, $b = p$ and $c = 16$</p> <p>Substituting above in equation (2) we have</p> $p^2 - 4 \times 1 \times 16 = 0$ $p^2 = 64 \Rightarrow p = \pm 8$ <p>When $p = 8$, from equation (1) we have</p> $x^2 + 8x + 16 = 0$ $x^2 + 2 \times 4x + 4^2 = 0$ $(x+4)^2 = 0 \Rightarrow x = -4, -4$ <p>Hence, roots are -4 and -4.</p> <p>When $p = -8$ from equation (1) we have</p> $x^2 - 8x + 16 = 0$ $x^2 - 2 \times 4x + 4^2 = 0$ $(x-4)^2 = 0 \Rightarrow x = 4, 4$ <p>Hence, the required roots are either $-4, -4$ or $4, 4$</p> <p>OR</p> $\frac{1}{x-2} + \frac{2}{x-1} = \frac{6}{x}$ $\frac{x-1+2x-4}{(x-2)(x-1)} = \frac{6}{x}$ $3x^2 - 5x = 6x^2 - 18x + 12$ $3x^2 - 13x + 12 = 0$ $3x^2 - 4x - 9x + 12 = 0$ $x(3x-4) - 3(3x-4) = 0$ $(3x-4)(x-3) = 0$ $x = \frac{4}{3} \text{ and } 3$	1/2 1/2+1/2
28	<p>Mid-point of AC,</p> $\left(\frac{-1+2}{2}, \frac{0+2}{2}\right) = \left(\frac{1}{2}, 1\right)$ <p>Mid-point of BD,</p> $\left(\frac{3-2}{2}, \frac{1+1}{2}\right) = \left(\frac{1}{2}, 1\right)$ <p>Here Mid-point of AC = Mid-point of BD Since diagonals of a quadrilateral bisect each other, $ABCD$ is a parallelogram.</p>	1/2+1/2 1/2+1/2 1/2 1/2
29	$= \frac{5\left(\frac{1}{2}\right)^2 + 4\left(\frac{\sqrt{3}}{2}\right)^2 - (1)^2}{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2}$ $= \frac{\frac{5}{4} + 3 - 1}{\frac{1}{4} + \frac{1}{4}}$ $= \frac{\frac{5}{4} + 2}{\frac{1}{2}} = \frac{\frac{13}{4}}{\frac{1}{2}} = \frac{13}{2}$ <p>OR</p> $\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 - \cos \theta} = \frac{\sin \theta (1 - 2 \sin^2 \theta)}{\cos \theta (2 \cos^2 \theta - 1)}$ $= \frac{\sin \theta (\sin^2 \theta + \cos^2 \theta - 2 \sin^2 \theta)}{\cos \theta (2 \cos^2 \theta - \sin^2 \theta - \cos^2 \theta)}$ $= \frac{\tan \theta (\cos^2 \theta - \sin^2 \theta)}{(\cos^2 \theta - \sin^2 \theta)}$ $= \tan \theta$	1 1/2+1/2 1/2+1/2 1/2+1/2 1/2 1/2

	<p>Let the fraction be $\frac{x}{y}$, then according to the question,</p> $\frac{x+2}{y+2} = \frac{9}{11}$ $11x + 22 = 9y + 18$ <p>or, $11x - 9y + 4 = 0 \quad \dots(1)$</p> <p>and $\frac{x+3}{y+3} = \frac{5}{6}$</p> <p>or, $6x - 5y + 3 = 0 \quad \dots(2)$</p> <p>Hence, $x = 7, y = 9$ Thus fraction is $\frac{7}{9}$.</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ Solving 1mk $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$
33	<p>Let AB be the building of height 7 m and CD be the tower of height h. Angle of depressions of top and bottom are given 30° and 60° respectively. As per given in question we have drawn figure below.</p> <p>Here $\angle CBD = \angle ECB = 45^\circ$ due to alternate angles. In right $\triangle ABC$ we have</p> $\frac{AB}{BC} = \tan 45^\circ$ $\frac{7}{x} = 1 \Rightarrow x = 7$ <p>In right $\triangle AEC$ we have</p> $\frac{CE}{AE} = \tan 60^\circ$ $\frac{h-7}{x} = \sqrt{3}$ $h-7 = x\sqrt{3} = 7\sqrt{3}$ $h = 7\sqrt{3} + 7$ $= 7(\sqrt{3} + 1)$ $= 7(1.732 + 1)$ <p>Hence, height of tower = 19.124 m</p> <p style="text-align: center;">OR</p>	Diag 1mk

<u>CASE BASED STUDY QUESTIONS ANSWERS</u>		
SETA 36	<p>Contest prize form a arithmetic sequence Rs 5000, i) Rs 4750, Rs 4500, Rs 4525000 Here $a_1 = 5000$ and $d = -250$ ii) For the value of 15th prize, $n = 15$,</p> $ \begin{aligned} a_n &= a_1 + (n-1)d \\ &= 5000 + (15-1)(-250) \\ &= 5000 + (15-1)(-250) \\ &= 5000 - 14 \times 250 = 1500 \text{ Rs} \end{aligned} $ <p>iii) Total amount of money distributed in prizes,</p> $ \begin{aligned} S_n &= \frac{n}{2}(a_1 + a_n) \\ S_{15} &= \frac{15}{2}(a_1 + a_{15}) \\ &= \frac{15}{2}(5000 + 1500) = \frac{15 \times 6500}{2} \\ &= 48750 \end{aligned} $ <p>Or last $S_{10} = S_{15} - S_5 = 48750 - 22500 = \text{Rs } 26250$</p>	1 1½ 1½
SET B 38	<p>i) Rs 4750, Rs 4500, Rs 45250 ii) $a_{12} = a + 11d = 5000 - 2750 = 2250$ iii) $S_{12} = 12/2(a + a_{12}) = 6(5000 + 2250) = \text{Rs } 43500$ Or last $S_{11} = S_{15} - S_4 = \text{Rs } 43500 - 18500 = \text{Rs } 25000$</p>	1 1½ 1½
SET C 37	<p>i) Rs6000,Rs 5600,Rs 5200,..... ii) $a_{15} = a + 14d = 6000 + 14 \times -400 = \text{Rs } 400$ iii) $S_{15} = 15/2(6000 + 400) = \text{Rs } 48000$ Or last $S_{10} = S_{15} - S_5 = \text{Rs } 48000 - 26000 = \text{Rs } 22000$</p>	1 1½ 1½
SET A 37	a) $\sqrt{281.25 \text{ units}}$ b) $(0,7/2)$ c) any point on x axis	1½+1½+1
SET B 36	a) $\sqrt{41}$ b) $(-2, 3.5)$ c) any point on x axis	1½+1½+1
SET C 38	a) $\sqrt{461} \text{ units}$ b) $(-12.5, 7.5)$ c) any point on x axis	1½+1½+1
SET A 38	i) $6/28 = 3/14$ ii) $4/28 = 1/14$ or $7/28 = 1/14$	2mk each
SET B 37	i) $9/28$ ii) $2/28 = 1/14$ or $7/28 = 1/14$	2mk each
SET C 36	i) $12/28 = 3/7$ ii) $2/28 = 1/14$ or $1 - 1/14 = 13/14$	2mks each