

Directorate of Government Examinations, Chennai - 6  
 SSLC Public Examination - March 2018  
 Mathematics - Answer key

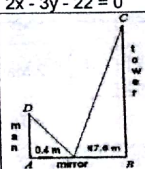
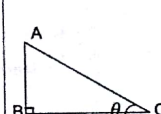
Total Marks :100

**Section - I**  
 (Marks : 15)

Choose the correct Answer :		15 x 1 = 15
1	(d) not possible	
2	(b) $\frac{a}{b}$	
3	(d) $\sqrt{48}$	
4	(d) 1	
5	(a) $(x-a)^2 (x^2+ax+a^2)$	
6	(a) $1 - \alpha^2 - \beta\gamma = 0$	
7	(a) -3	
8	(c) (0,0)	
9	(c) 4.5 cm	
10	(c) 60 m	
11	(a) $\sec^2 \theta - \tan^2 \theta$	
12	(d) greater than one	
13	(a) $40 \text{ cm}^3$	
14	(a) $6\sqrt{2}$	
15	(b) $\frac{7}{10}$	

**Section - II** (Marks :20)

I. Answer 10 Questions .		
II. Select any 9 questions from the first 14 questions. Question No: 30 is compulsory.		10 X 2 =20
16	$A \not\subset B$ (OR) A is not a subset of B because $a \notin B, b \notin B, c \notin B$	1 1 2 Marks
17	range of $f = \{-1, 1\}$ not a function	1 1 2 Marks

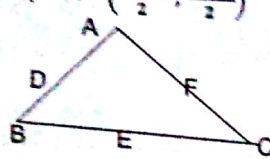
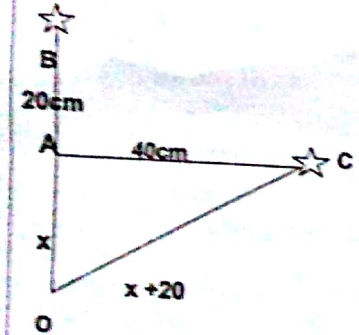

18	$2x, 5x-7, 7x$ are in A.P the required numbers are 28,70,98	1 1 2 Marks
19	dividend = [ quotient x divisor ] + Remainder (OR) $(X+2)(X-1)+4$ dividend = $x^2+x+2$	1 1 2 Marks
20	$1 \times 30, 2 \times 15, 3 \times 10, 5 \times 6$ $30 \times 1, 15 \times 2, 10 \times 3, 6 \times 5$	1 1 2 Marks
21	$AB = \begin{pmatrix} 15 & 4 \\ 12 & 0 \end{pmatrix}$ $BA = \begin{pmatrix} 9 & 6 \\ 17 & 6 \end{pmatrix}$	1 1 2 Marks
22	Section Formula (internally) $\left(\frac{lx_2+mx_1}{l+m}, \frac{ly_2+my_1}{l+m}\right)$ (OR) $\left(\frac{4l-3m}{l+m}, \frac{-9l+5m}{l+m}\right) = (-2,3)$ $l : m = 1 : 6$	1 1 2 Marks
23	Equation of straight line (slope-point) $y-y_1 = m(x-x_1)$ (OR) $y+4 = \frac{2}{3}(x-5)$ $2x - 3y - 22 = 0$	1 1 2 Marks
24	 diagram - 1 mark mention the values - 1 mark	2 2 2 Marks
25	By Pythagoras theorem $AB^2 + BC^2 = AC^2$ Divide by $AC^2$ $\sin^2 \theta + \cos^2 \theta = 1,$	1 1 2 Marks
		
26	$(\sec \theta - \tan \theta)(\sec \theta + \tan \theta)$ $= \sec^2 \theta - \tan^2 \theta = 1$	1 1 2 Marks
27	CSA of the cone = Area of the sector = $\frac{\theta}{360} \times \pi \times R^2$ $= 462 \text{ sq.cm}$	1 1 2 Marks

28	<table border="1"> <tr><th>x</th><th>x<sup>2</sup></th></tr> <tr><td>14</td><td>196</td></tr> <tr><td>16</td><td>256</td></tr> <tr><td>20</td><td>400</td></tr> <tr><td>21</td><td>441</td></tr> <tr><td>25</td><td>625</td></tr> <tr><td>30</td><td>900</td></tr> <tr><td><math>\Sigma x = 126</math></td><td><math>\Sigma x^2 = 2818</math></td></tr> </table>	x	x <sup>2</sup>	14	196	16	256	20	400	21	441	25	625	30	900	$\Sigma x = 126$	$\Sigma x^2 = 2818$	1	2 Marks
	x	x <sup>2</sup>																	
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30	900																		
$\Sigma x = 126$	$\Sigma x^2 = 2818$																		
29	$n(s) = 100$ , $P(A) = \frac{4}{100} = \frac{1}{25}$ $P(\bar{A}) = \frac{96}{100} = \frac{24}{25}$	1																	
30 (a)	$x^2 - (\sqrt{3} + 1)x + \left(\frac{\sqrt{3}+1}{2}\right)^2 = \left(\frac{\sqrt{3}+1}{2}\right)^2 - \sqrt{3}$ $x = \sqrt{3}$ or $x = 1$	1																	
(or)		1																	
30 (b)	TSA of the hollow hemisphere $= \pi(3R^2 + r^2)$ $= 57.33\pi \text{ cm}^2$ (or) $180.18 \text{ cm}^2$	1																	
		1																	

**Section - III (Marks : 45)**

I. Answer any 9 Questions .		9 x 5 = 45
II. Question No: 45 is compulsory. Select any 8 questions from the first 14 questions.		
31	<p>a) no.of.students did not like any of the 3 types = 20 b) no.of.students liked any 2 types only = 25 c) no.of.students liked folk music but not rock music = 36</p>	2
32	(a) $f(-7) = 36, f(-3) = 2$ $f(-7) - f(-3) = 34$	1
	(b) $f(4) = 3; f(-6) = 25; f(1) = 6$	1
	$\frac{4f(-3)+2f(4)}{f(-6)-3f(1)} = \frac{14}{7} = 2$	1

33	$(a-d)+a+(a+d) = 18$ $a = 6$ $(a-d)^2 + a^2 + (a+d)^2 = 140$ $d = \pm 4$ 2,6,10 (or) 10,6,2	1 1 1 1	5 Marks														
34	$\frac{3}{x} + \frac{6}{y} = 7, \frac{9}{x} + \frac{3}{y} = 11$ $3a + 6b = 7; 9a + 3b = 11$ $a = 1; b = \frac{2}{3}$ $x = 1; y = \frac{3}{2}$ solution of the system $(1, \frac{3}{2}), (0,0)$ (or) $(1, \frac{3}{2})$	1 1 1 1	5 Marks														
35	<table border="1"> <tr><td><math>4x^2</math></td><td><math>16x^4 - 24x^3 + 25x^2 - 12x + 4</math></td></tr> <tr><td><math>8x^2 - 3x</math></td><td><math>16x^4</math></td></tr> <tr><td></td><td><math>-24x^3 + 25x^2</math></td></tr> <tr><td></td><td><math>-24x^3 + 9x^2</math></td></tr> <tr><td><math>8x^2 - 6x + 2</math></td><td><math>16x^2 - 12x + 4</math></td></tr> <tr><td></td><td><math>16x^2 - 12x + 4</math></td></tr> <tr><td></td><td>0</td></tr> </table> $\sqrt{16x^4 - 24x^3 + 25x^2 - 12x + 4} =  4x^2 - 3x + 2 $	$4x^2$	$16x^4 - 24x^3 + 25x^2 - 12x + 4$	$8x^2 - 3x$	$16x^4$		$-24x^3 + 25x^2$		$-24x^3 + 9x^2$	$8x^2 - 6x + 2$	$16x^2 - 12x + 4$		$16x^2 - 12x + 4$		0	2 1 1	5 Marks
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	0																
36	$y^2 - x^2 = 45, x < y$ $x^2 = 4y$ $y^2 - 4y - 45 = 0$ $y = 9, y = -5$ required numbers $x = 6; y = 9$	1 1 1 1	5 Marks														
37	$AB = \begin{pmatrix} 8 & -3 \\ 11 & -4 \end{pmatrix}$ $(AB)^T = \begin{pmatrix} 8 & 11 \\ -3 & -4 \end{pmatrix}$ $B^T = \begin{pmatrix} 2 & -1 \\ -1 & 1 \end{pmatrix}$ $A^T = \begin{pmatrix} 5 & 7 \\ 2 & 3 \end{pmatrix}$ $B^T A^T = \begin{pmatrix} 8 & 11 \\ -3 & -4 \end{pmatrix}$	1 1 1 1	5 Marks														

38	Area of the Quadrilateral = $\frac{1}{2} \begin{vmatrix} -3 & -5 & 4 & 1 & -3 \\ 4 & -6 & -1 & 2 & -4 \end{vmatrix}$ sq. units  = $\frac{1}{2}  (18 + 5 + 8 + 4) - (-20 - 24 - 1 - 6) $  = $\frac{1}{2} (86)$  = 43 sq. units	2 1 1 1	5 Marks
39	Diagram mid point = $(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$   $x_1+x_2+x_3=17; y_1+y_2+y_3=20$  $A(x_1, y_1) = (1, 2)$ $B(x_2, y_2) = (5, 6)$ $C(x_3, y_3) = (11, 12)$	1 1 1 1 1	5 Marks
	<b>Note:</b> If anyone prove the above three points as collinear, then give 5 marks for the proof.		
40	  OC = OA + AB = x + 20 cm by Pythagoras theorem, $OC^2 = OA^2 + AC^2$ $(x + 20)^2 = x^2 + 40^2$ X = 30 cm	1 1 2 1	5 Marks
41	Diagram   $\tan 60^\circ = \frac{50}{BC}$ $BC = \frac{50}{\sqrt{3}}$  $\tan 30^\circ = \frac{CD}{BC}$ CD = 16.67 m	1 1 1 1 1	5 Marks

42	$r + h = 37$ $2\pi r(h+r) = 1628 \text{ cm}^2$ $r = 7 \text{ cm}$ $h = 30 \text{ cm}$ $V = \pi r^2 h$ $v = 4620 \text{ cm}^3$ (OR) $1470 \pi \text{ cm}^3$	1 1 1 1 1	5 Marks
43	$\bar{x} = \frac{\sum x_i}{n} = \frac{35}{5} = 7$ $\sum (x_i^2 - 18x_i + 81) = 82$ $\sum x_i^2 = 307$ $\sum [(x_i - 7) - 2]^2 = 82$ $\sum (x_i - \bar{x})^2 = 62$	1 1 1 1 1	5 Marks
44	$s = \{(1,1) (1,2) (1,3) \dots (6,6)\}$ $n(s) = 36$ $P(A) = \frac{12}{36}; P(B) = \frac{9}{36}$ $P(A \cap B) = \frac{1}{36}$ $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $P(A \cup B) = \frac{20}{36}$ $P(A' \cap B') = \frac{4}{9}$	1 2 1 1	5 Marks
45	(a) $t_n = ar^{n-1}$ $375 r^3 = 192$ (or) $a = 375, ar^3 = 192$ $r = \frac{4}{5}$ $s_n = a \left( \frac{1-r^n}{1-r} \right)$ $S_{14} = \frac{375[1 - (\frac{4}{5})^{14}]}{1 - \frac{4}{5}}$ $S_{14} = 1875 [1 - (\frac{4}{5})^{14}]$	1 1 1 1 1	5 Marks
	(or)		
45	(b) Cylindrical tank $r_1 = 2 \text{ m}$ $h_1 = 10 \text{ m}$ Cylindrical pipe $r_2 = \frac{5}{100} \text{ m}, h_2 = T \times 2500 \text{ m}$ volume of the water discharged through the cylindrical pipe = $\frac{1}{2}$ {volume of water tank} $\pi r_2^2 h_2 = \frac{1}{2} (\pi r_1^2 h_1)$ $\pi \times \frac{5}{100} \times \frac{5}{100} \times T \times 2500 = \frac{1}{2} \times \pi \times 2 \times 2 \times 10$ T = 3.2 hrs (or) 3 hrs 12 min	1 1 1 1 1	5 Marks

## SECTION - IV

(Marks : 20)

Note : Answer both the questions choosing either of the alternatives.		2 x 10 = 20																													
46	(a) Rough diagram First circle Line segment Perpendicular bisector Second Circle Two tangents Length of Tangents = 8.4 cm (or) 8.5 cm	2 2 1 1 2 1 1	10 Marks																												
	(or)																														
47	(b) Rough diagram Line segment PQ Triangle PQR Perpendicular bisector Circum circle Cyclic Quadrilateral PQRS	2 1 3 2 1 1	10 Marks																												
	(a) <table border="1" style="margin: 5px 0; width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">x</td> <td style="padding: 2px 5px;">-4</td> <td style="padding: 2px 5px;">-3</td> <td style="padding: 2px 5px;">-2</td> <td style="padding: 2px 5px;">-1</td> <td style="padding: 2px 5px;">0</td> <td style="padding: 2px 5px;">1</td> <td style="padding: 2px 5px;">2</td> <td style="padding: 2px 5px;">3</td> </tr> <tr> <td style="padding: 2px 5px;">y</td> <td style="padding: 2px 5px;">6</td> <td style="padding: 2px 5px;">2</td> <td style="padding: 2px 5px;">0</td> <td style="padding: 2px 5px;">0</td> <td style="padding: 2px 5px;">2</td> <td style="padding: 2px 5px;">6</td> <td style="padding: 2px 5px;">12</td> <td style="padding: 2px 5px;">20</td> </tr> </table> Any five points x- axis, y -axis ,scale Plotting the Points and drawing the parabola $y = x - 2$ <table border="1" style="margin: 5px 0; width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">x</td> <td style="padding: 2px 5px;">-2</td> <td style="padding: 2px 5px;">0</td> <td style="padding: 2px 5px;">1</td> <td style="padding: 2px 5px;">2</td> </tr> <tr> <td style="padding: 2px 5px;"><math>y = x - 2</math></td> <td style="padding: 2px 5px;">-4</td> <td style="padding: 2px 5px;">-2</td> <td style="padding: 2px 5px;">-1</td> <td style="padding: 2px 5px;">0</td> </tr> </table> Plotting the Points and drawing the straight line Solution set. No real roots	x	-4	-3	-2	-1	0	1	2	3	y	6	2	0	0	2	6	12	20	x	-2	0	1	2	$y = x - 2$	-4	-2	-1	0	3  2 2  1  1 1	10 Marks
x	-4	-3	-2	-1	0	1	2	3																							
y	6	2	0	0	2	6	12	20																							
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	x	1	2	3	4	5	6																								
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