COMMON QUARTERLY EXAMINATION, SEPTEMBER - 2019

SSLC - MATHEMATICS - ANSWER KEY MARKS: 100

PART – I (Marks 14)

Choose the correct answers: 14 x 1 =14		
Q. No.	**Option**	**Answer**
1	d	quadratic
2	c	pxq
3	b	5
4	b	$\left(y+\frac{1}{y}\right)^2$
5	c	0
6	a	1
7	b	$\frac{1}{27}$
8	b	Natural numbers
9	b	70^o
10	a	1.4 cm
11	b	25 sq.units
12	c	45^o
13	d	$\cot\theta$
14	a	0

PART – II [MARKS : 20]

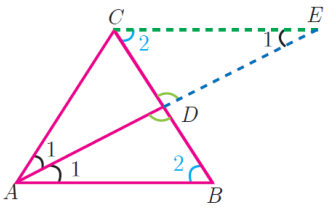
Answer any TEN Questions [Question No. 28 is compulsory]. **Each questions carries 2 marks.**			**10 x 2 = 20**
15	A = { 3,4 } B = { −2,0, 3 }	1 1	2 Marks
16	(i) f = { (−2,2),(−1, −1),(0, −2),(3,7) } (ii) Yes, Every value of x has unique image.	1 1	2 Marks
17	445−4=441; 572−5=567 567 = 441x1 +126 441 = 126x3 +63 126 = 63x2 + 0 Required greatest number is 63	1 1	2 Marks
18	$n=\frac{l-a}{d}+1$ (or) $n=\frac{-54-16}{-5}+1$ $n=15$	1 1	2 Marks
19	$\frac{(x+4)(x-4)}{(x+4)(x+4)}$ $\frac{(x-4)}{(x+4)}$	1 1	2 Marks
20	x^2-(sum of the roots)x+(product of the roots)=0 (*or*) $x^2-\left(\frac{-3}{2}\right)x+(-1)=0$ Required Quadratic Equation is $2x^2+3x-2=0$	1 1	2 Marks
21	$\frac{\text{Area of DEF}}{\text{Area of}}$ $\frac{EF^2}{2}$ (or) $\frac{\text{Area of DEF}}{54}$ $\frac{4^2}{3^2}$ Area of ΔDEF = 96 cm^2	1 1	2 Marks
22	$LHS=\frac{\cos\theta(1-\sin\theta)}{(1+\sin\theta)(1-\sin\theta)}=\frac{\cos\theta(1-\sin\theta)}{\cos^2\theta}$ $=\frac{1}{\cos\theta}-\frac{\sin\theta}{\cos\theta}=\sec\theta-\tan\theta$	1 1	2 Marks

23	$C.V = \frac{\sigma}{\bar{x}} \times 100$ (or) $C.V = \frac{6.5}{12.5} \times 100$ $C.V = 52\%$	1 1	2 Marks
24	*Slope* m=tan 30° $m = \frac{1}{\sqrt{3}}$	1 1	2 Marks
25	$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-1}{2}$ (or) $\frac{3-a}{9+2} = \frac{-1}{2}$ $a = \frac{17}{2}$	1 1	2 Marks
26	f(1) = 0 ; f(2) = 3 ; f(3) = 8 ; f(4) = 15 ; f(5) = 24 Range of f = {0,3,8,15,24}	1 1	2 Marks
27	$S_n = 2(1+2+3+.....+12) = 2\left(\frac{12}{2}(1+12)\right)$ Number of times clock strikes in a day = 156 times	1 1	2 Marks
28	$P(x) = (x+13)(x-11)$ $P(-13) = 0;\ P(11) = 0$ Zeros of P(x) are -13 and 11	1 1	2 Marks

PART – III [MARKS : 50]

Answer any TEN Questions [Question No. 42 is compulsory]. **Each questions carries 5 marks.**		**10 x 5 = 50**	
29	$A \cap C = \{3\};\ B \cap D = \{3,5\}$ $(A \cap C) \times (B \cap D) = \{(3,3),(3,5)\} ----> (1)$ $A \times B = \{(1,2),(1,3),(1,5),(2,2),(2,3),(2,5),(3,2),(3,3),(3,5)\}$ $C \times D = \{(3,1),(3,3),(3,5),(4,1),(4,3),(4,5)\}$ $(A \times B) \cap (C \times D) = \{(3,3),(3,5)\} ----> (2)$ $\therefore (A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$	1 1 1 1 1	5 Marks

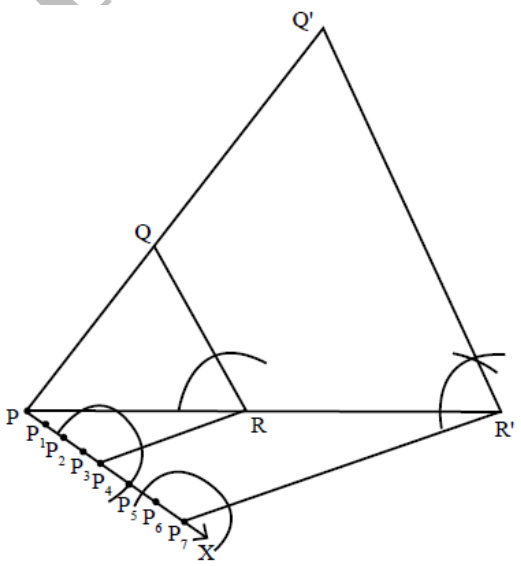
30	$f(g(x)) = 6x + 3k - 2$ $g(f(x)) = 6x - 4 + k$ $Given: 6x + 3k - 2 = 6x - 4 + k$ $k = -1$	1 1 1 2	5 Marks
31	$S_1 = \frac{n}{2}[2a + (n-1)d]$ $S_2 = \frac{2n}{2}[2a + (2n-1)d]$ $S_3 = \frac{3n}{2}[2a + (3n-1)d] ------> (1)$ $S_2 - S_1 = \frac{n}{2}\{[4a + 2(2n-1)d] - [2a + (n-1)d]\}$ $3(S_2 - S_1) = \frac{3n}{2} \times [2a + (3n-1)d] ------> (2)$ $S_3 = 3(S_2 - S_1)$	1 1 1 1 1	5 Marks
32	$= (1^2 + 2^2 + 3^2 + ... + 21^2) - (1^2 + 2^2 + 3^2 + ... + 5^2)$ $= \frac{21 \times 22 \times 43}{6} - \frac{5 \times 6 \times 11}{6}$ $= 3311 - 55$ $= 3256$	1 1 2 1	5 Marks
33	$f(x) = 2x(2x^3 + 7x^2 + 4x - 4)$ $g(x) = 3x(x^3 + 2x^2 - 4x - 8)$ $x^3 + 2x^2 - 4x - 8 \;\big|\; 2$ $2x^3 + 7x^2 + 4x - 4$ $2x^3 + 4x^2 - 8x - 16$ $3x^2 + 12x + 12$ $3(x^2 + 4x + 4) \neq 0$ $x^2 + 4x + 4 \;\big|\; x - 2$ $x^3 + 2x^2 - 4x - 8$ $x^3 + 4x^2 + 4x$ $-2x^2 - 8x - 8$ $-2x^2 - 8x - 8$ 0 $GCD = x(x^2 + 4x + 4)$	2 2 1	5 Marks

34	$\frac{x}{y}-5+\frac{y}{x}$ $\frac{x}{y}$ | $\frac{x^2}{y^2}-10\frac{x}{y}+27-10\frac{y}{x}+\frac{y^2}{x^2}$ $\frac{x^2}{y^2}$ $2\frac{x}{y}-5$ | $-10\frac{x}{y}+27$ $-10\frac{x}{y}+25$ $2\frac{x}{y}-10+\frac{y}{x}$ | $2-10\frac{y}{x}+\frac{y^2}{x^2}$ $2-10\frac{y}{x}+\frac{y^2}{x^2}$ 0 $\sqrt{\frac{x^2}{y^2}-10\frac{x}{y}+27-10\frac{y}{x}+\frac{y^2}{x^2}}=\left\|\frac{x}{y}-5+\frac{y}{x}\right\|$	1 1 1 2	5 Marks
35	**Angle Bisector Theorem** **Statement :**The internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the corresponding sides containing the angle. **Proof:** **Given:** In ΔABC, AD is the internal bisector **To prove :** $\frac{AB}{AC}=\frac{BD}{CD}$  **Construction:** Draw $CE \parallel AB$ to meet extend of AD at E. (i) $\angle AEC=\angle BAE$ ($\because$ Alternate angles) (ii) ΔACE is isosceles, AC=CE . ($\because \angle CEA=\angle BAE$) ΔABD ~ ΔECD ($\because$ AA similarity) (iii) $\frac{AB}{CE}=\frac{BD}{CD}$ ($\because$ Corresponding sides are proportional) (iv) $\frac{AB}{AC}=\frac{BD}{CD}(\because$ AC=CE$)$ Hence ABT is proved Note : Without diagram give 1 mark only for statement	1 1 1 2	5 Marks

36	*Given* : $a+b=1 \text{----->} (1)$ Area of triangle $=0$ (or) $\frac{1}{2}\begin{bmatrix} -3 & a & 4 & -3 \\ 9 & b & -5 & 9 \end{bmatrix}=0$ $-5a-3b+36-9a-4b-15=0$ $2a+b=3 \text{----->} (2)$ Solve (1) and (2), $a = 2$; b = -1	1 1 1 2	5 Marks
37	*Given* : $A(1,-4), B(2,-3), C(4,-7)$ *Slope* of AB = 1 *Slope* of BC = -2 *Slope* of AC = -1 *Slope* of AB $\times$ *Slope* of AC = -1 $AB \perp AC$, $\angle$A=90° $\therefore$ ΔABC is a right angled triangle.	1 1 1 1 1	5 Marks
38	$LHS=\left(\frac{1}{\cos\theta}+\frac{1}{\sin\theta}\right)\times\left(\sin^2\theta+\cos^2\theta+2\sin\theta.\cos\theta-1\right)$ $=\frac{\sin\theta+\cos\theta}{\sin\theta.\cos\theta}\times 2\sin\theta\cos\theta$ $=2(\sin\theta+\cos\theta)$ =RHS	2 2 1	5 Marks
39	$\bar{x}=45$ $\sum d=-8$; $\sum d^2=172$ $\sigma=\sqrt{\frac{\sum d^2}{n}-\left(\frac{\sum d}{n}\right)^2}$ $\sigma=\sqrt{20.5}\simeq 4.53$ C.V = $\frac{\sigma}{\bar{x}}\times 100=10.07\%$	1 1 1 1 1	5 Marks
40	$\sum x=68$; $\sum x^2=690$ $\sigma=\sqrt{\frac{\sum x^2}{n}-\left(\frac{\sum x}{n}\right)^2}$ $\sigma=\sqrt{14}\simeq 3.74$	2 2 1	5 Marks

41	$x^2-2\left(\frac{3}{5}\right)x=\frac{2}{5}$ $x^2-2\left(\frac{3}{5}\right)x+\frac{9}{25}=\frac{9}{25}+\frac{2}{5}$ $\left(x-\frac{3}{5}\right)^2=\frac{19}{25}$ $x-\frac{3}{5}=\pm\frac{\sqrt{19}}{5}$ $x=\frac{3+\sqrt{19}}{5};\ x=\frac{3-\sqrt{19}}{5}$	1 1 1 1 1	5 Marks
42	$ar^3=54;\ ar^6=1458$ $\frac{ar^6}{ar^3}=\frac{1458}{54}$ $r=3$ $a=2$ Required G.P is 2,6,18,54,.....	1 1 1 1 1	5 Marks

SECTION – IV [MARKS : 16]

Answer both questions. Each questions carries 8 marks			**2x8=16**
43	Construct of ΔPQR Draw a ray QX and Locate 7 points Draw $Q_7R^1 \parallel QR$ Draw $R^1P^1 \parallel RP$  	2 2 2 2	8 Marks

(OR)

By using Thales Theorem,

$\frac{AD}{DB} = \frac{AE}{EC}$ — 1

$\frac{x}{x-2} = \frac{x+2}{x-1}$ — 1

$x^2 - x = x^2 - 4$ — 1

$x = 4$ — 1

$\therefore AD = 4;\ DB=2;\ AE=6;\ EC=3$ — 2

$AB = AD + DB = 6$ — 1

$AC = AE + EC = 9$ — 1

8 Marks

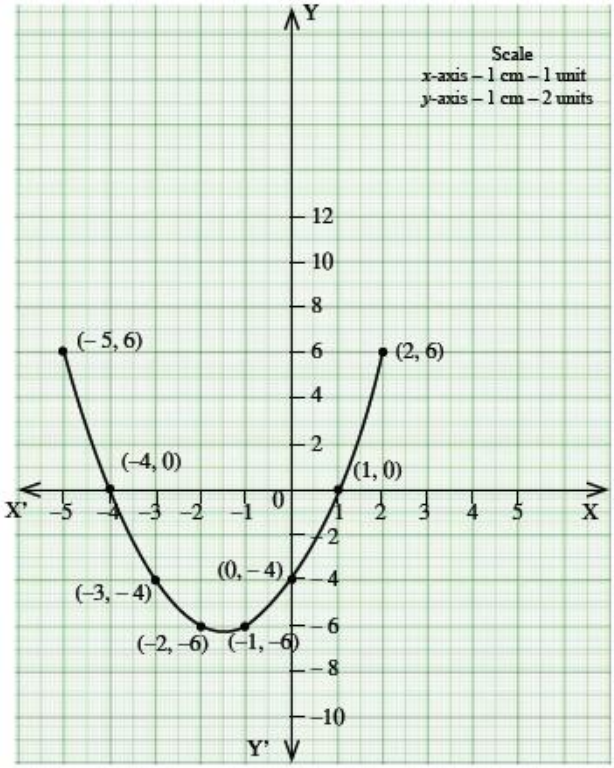
44

First Table (any 5 points) — 3

X	-5	-4	-3	-2	-1	0	1	2
Y	6	0	-4	-6	-6	-4	0	6

X-axis , Y-axis and Scale — 1

Draw parabola $y=x^2+3x-4$



3

Solve the parabola and equation, we get y = 0 — 1

solution set is {-4,1}

8 Marks

(OR)

	$\frac{1}{3}(x+y-5)=y-z \Rightarrow x-2y+3z=5 \text{------>}(1)$	1
	$y-z=2x-11 \Rightarrow 2x-y+z=11 \text{------>}(2)$	1
	$2x-11=9-(x+2z) \Rightarrow 3x+2z=20 \text{------>}(3)$	1
	Solve (1) and (2), we get $3x-z=17 \text{------>}(4)$	1
	Solve (3) and (4), we get $z=1$	1
	Sub z = 1 in (4), we get x = 6	1
	Sub z = 1 and x = 6 in (1), we get y = 2	1
	Solution: x = 6 ; y = 2 ; z = 1	1

8 Marks