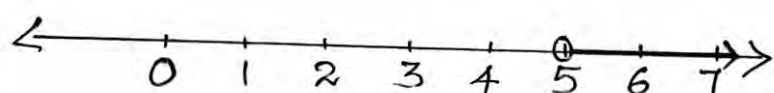
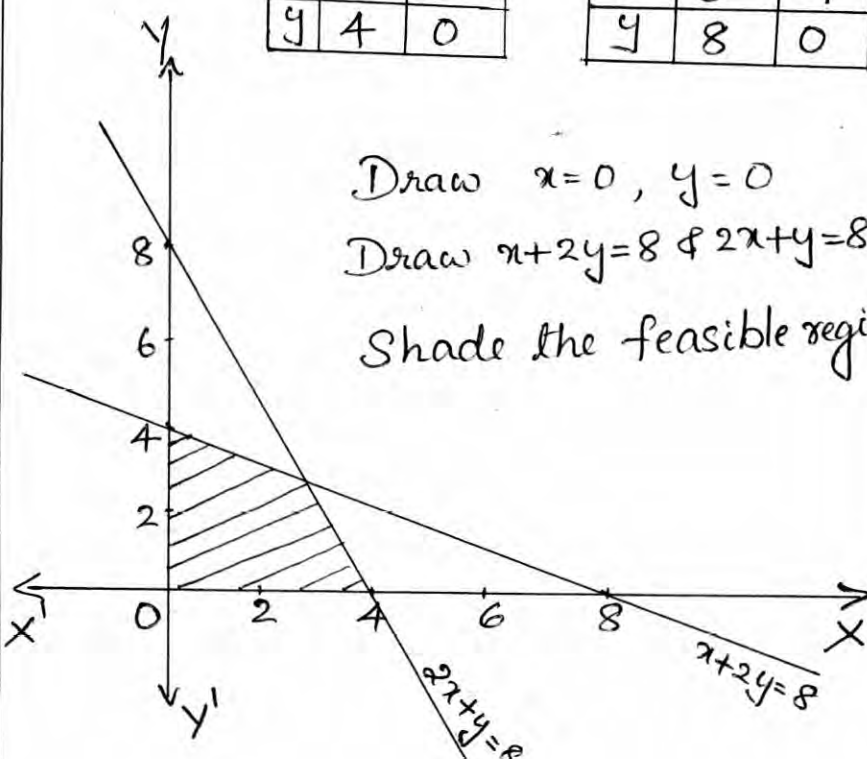


Qn No	Sub Qns	Answer Key/Value Points	Score	Total										
3	a)	<table><tr><th>A</th><th>B</th></tr><tr><td>a) $\sin(\pi+x)$</td><td>$-\sin x$</td></tr><tr><td>b) $\sin(\frac{\pi}{2}+x)$</td><td>$\cos x$</td></tr><tr><td>c) $\cos(\frac{\pi}{2}-x)$</td><td>$\sin x$</td></tr><tr><td>d) $\sin(\frac{3\pi}{2}+x)$</td><td>$-\cos x$</td></tr></table>	A	B	a) $\sin(\pi+x)$	$-\sin x$	b) $\sin(\frac{\pi}{2}+x)$	$\cos x$	c) $\cos(\frac{\pi}{2}-x)$	$\sin x$	d) $\sin(\frac{3\pi}{2}+x)$	$-\cos x$	1 1 1 1 } 4	5
A	B													
a) $\sin(\pi+x)$	$-\sin x$													
b) $\sin(\frac{\pi}{2}+x)$	$\cos x$													
c) $\cos(\frac{\pi}{2}-x)$	$\sin x$													
d) $\sin(\frac{3\pi}{2}+x)$	$-\cos x$													
	b)	ii) 2 nd quadrant	1											
4		$P(1): 1=1^2 \Rightarrow P(1)$ is true $P(k): 1+3+5+\dots+(2k-1)=k^2$ $P(k+1): 1+3+\dots+(2k-1)+(2k+1)=k^2+2k+1$ $= (k+1)^2 \Rightarrow P(k+1)$ is true Thus by PMI, $P(n)$ is true for all $n \in \mathbb{N}$	1 1 1 1 } 4	4										
5	a)	iii) $\frac{1-i}{2}$	1											
	b)	$1+i = r(\cos\theta + i\sin\theta)$ $r\cos\theta = 1$ & $r\sin\theta = 1$ $r^2 = 2 \Rightarrow r = \sqrt{2}$ $\tan\theta = 1 \Rightarrow \theta = \frac{\pi}{4}$ $\therefore 1+i = \sqrt{2}(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4})$	1 1 1 } 3											

Qn No	Sub Qns	Answer Key/Value Points	Score	Total											
	c)	$x = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 1 \times 2}}{2 \times 1} = \frac{2 \pm 2i}{2} = 1 \pm i$ Remark: For the formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ give $\frac{1}{2}$ score	1	5											
6	a)	i) $(5, \infty)$	1												
	b)	 Remark: For drawing number line give $\frac{1}{2}$ score.	1	5											
	c)	<table> <caption>$x+2y=8$</caption> <tr><td>x</td><td>0</td><td>8</td></tr> <tr><td>y</td><td>4</td><td>0</td></tr> </table> <table> <caption>$2x+y=8$</caption> <tr><td>x</td><td>0</td><td>4</td></tr> <tr><td>y</td><td>8</td><td>0</td></tr> </table>  Draw $x=0, y=0$ Draw $x+2y=8$ & $2x+y=8$ Shade the feasible region $\left. \begin{matrix} 1 \\ 1 \\ 1 \end{matrix} \right\} 3$	x		0	8	y	4	0	x	0	4	y	8	0
x	0	8													
y	4	0													
x	0	4													
y	8	0													

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
7	a)	ii) $15C_2$	1	6
	b)	$2 \cdot \frac{n!}{(n-3)!} = \frac{(n+1)!}{(n+1-3)!}$ $\Rightarrow 2(n-2) = n+1 \Rightarrow n=5$ Remark: For the formula for nPr give one score	$\left. \begin{matrix} 1 \\ 1 \end{matrix} \right\} 2$	
	c)	$6 \times 6 = 36$ No. of digits used in unit place = 3 No. of digits used in 10^{th} place = 6 $\therefore$ Total no. of 2 digit even numbers formed = $3 \times 6 = 18$	$\left. \begin{matrix} 1 \\ \frac{1}{2} \\ \frac{1}{2} \end{matrix} \right\} 2$	
		OR		
	a)	iii) 22	1	
	b)	Triangles cannot be formed by the line segments (2, 3, 5), (2, 4, 6), (2, 3, 6) - Since the sum of two sides of a triangle is always greater than the 3rd side $\therefore$ No. of triangles formed = $5C_3 - 3$ $= 10 - 3$ $= 7$ Remark: for writing $5C_3$ give (1½) score	$\left. \begin{matrix} 1 \\ 1 \end{matrix} \right\} 2$	

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Qn No	Sub Qns	Answer Key/Value Points	Score	Total
	c)	$12C_3 = 220$ $12C_3 - 7C_3$ $= 220 - 35 = 185$ Remark: for writing answer $12C_3$ or $7C_3$ give one score	$\left. \begin{matrix} 1 \\ 1 \\ 1 \end{matrix} \right\} 2$	6
8	a)	iii) 23 rd term	1	4
	b)	$t_{21} = 44C_{20} x^{20}$ $t_{22} = 44C_{21} x^{21}$ $t_{21} = t_{22} \Rightarrow \frac{44C_{20}}{44C_{21}} = x$ $\Rightarrow x = \frac{21}{24}$ $= \frac{7}{8}$	$\left. \begin{matrix} 1 \\ 1 \\ 1 \end{matrix} \right\} 3$	
9	a)	iv) $P+q-r$	1	
	b)	$a+ax+ax^2+\dots = 5(a+ax^2+ax^4+\dots)$ $\frac{a}{1-x} = 5 \times \frac{a}{1-x^2}$ $\Rightarrow x = 4$ Remark: for any correct formula for sum of finite or infinite terms give one score	$\left. \begin{matrix} 1 \\ 1 \end{matrix} \right\} 2$	

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Qn No	Sub Qns	Answer Key/Value Points	Score	Total
	c)	$5(a+4d) = 8(a+7d)$ $\Rightarrow 3a + 36d = 0$ $\Rightarrow a + 12d = 0$ $\Rightarrow a_{13} = 0$ Remark: for writing formula for or 8th term give one score	$\left. \begin{array}{l} 1 \\ 2 \\ 1 \end{array} \right\} 2$ 5 th term	5
	a)	OR iii) $2(d-c)$	1	
	b)	$ax^9 = 9$ $ax^3 = 4$ $\frac{ax^9}{ax^3} = \frac{9}{4}$ $a_7 = 6$ Remark: For any correct alternative method give full score	$\left. \begin{array}{l} \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \end{array} \right\} 2$	5
	c)	$a + 6d = 40$ $S_{13} = \frac{13}{2} [2a + 12d] = 13(a + 6d)$ $= 13 \times 40 = 520$ Remark: For formula for sum of an A.P give $\frac{1}{2}$ score	$\left. \begin{array}{l} 1 \\ 2 \\ 1 \end{array} \right\} 2$	

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Qn No	Sub Qns	Answer Key/Value Points	Score	Total
10	a)	i) $-\frac{11}{7}$	1	5
	b)	Equation to any line $\perp$ to $3x+y=3$ is $x-3y=k$. Since it passes through $(2,2)$ $2-6=k \Rightarrow k=-4$ Equation of required line is $x-3y+4=0$ Remark: For any correct alternative method give full score	1 } 2 1 }	
	c)	$3x+4y=5 \Rightarrow \frac{x}{(5/3)} + \frac{y}{(5/4)} = 1$ x intercept $= 5/3$ y intercept $= 5/4$	1 } 2 1 }	
		OR		
	a)	iv) $ y $	1	
	b)	Point of intersection is $(0,0)$ Equation of the line is $\frac{x-0}{2-0} = \frac{y-0}{3-0} \Rightarrow 3x-2y=0$ Remark: For any correct alternative method give full score	1 } 2 1 }	

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Qn No	Sub Qns	Answer Key/Value Points	Score	Total
	c)	Equation to any line parallel to $3x-2y=0$ is $3x-2y+K=0$ Since it passes through $(1,1)$, $K=-1$ Equation of the line is $3x-2y-1=0$	1 2 1	5
11	a)	$x^2+y^2-6x-4y-30=0$ $\Rightarrow (x-3)^2+(y-2)^2=16$ $\Rightarrow \text{centre} = (3,2)$ Equation of the required circle is $(x-3)^2+(y-2)^2=5^2$ Remark: Formula for equation of a circle give one score	$1\frac{1}{2}$ $\frac{1}{2}$	4
	b)	Equation of Parabola, $x^2=4ay$ Since it passes through $(6,-3)$ $36 = -4a \times 3 \Rightarrow a = -3$ Equation of Parabola is $x^2 = -12y$	1 $\frac{1}{2}$ $\frac{1}{2}$	2
	a)	OR $a=4$ $b=2\sqrt{3}$ or $\sqrt{12}$ $b^2 = a^2(1-e^2) \Rightarrow 12 = 16(1-e^2) \Rightarrow e = \frac{1}{2}$ Foci = $(\pm ae, 0) = (\pm 2, 0)$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2

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Qn No	Sub Qns	Answer Key/Value Points	Score	Total
		$= \lim_{h \rightarrow 0} \frac{2 \cos\left(x + \frac{h}{2}\right) \sin\left(\frac{h}{2}\right)}{h}$ $= \lim_{h \rightarrow 0} \cos\left(x + \frac{h}{2}\right) \lim_{h \rightarrow 0} \frac{\sin\left(\frac{h}{2}\right)}{\left(\frac{h}{2}\right)}$ $= \cos x$ Remark: For direct answer give $\frac{1}{2}$ score.	$\frac{1}{2}$ 3 $\frac{1}{2}$	4
14	a)	$\sqrt{5}$ is irrational 3 is rational	$\left. \begin{matrix} 1 \\ 1 \end{matrix} \right\} 2$	4
	b)	Let $\sqrt{2} = \frac{p}{q}$ where p and q have no common factors $p^2 = 2q^2 \Rightarrow p \text{ is even}$ $p = 2x \Rightarrow 4x^2 = 2q^2 \Rightarrow q^2 = 2x^2 \Rightarrow q \text{ is even}$ Thus p & q have a common factor 2. This is a contradiction $\therefore \sqrt{2}$ is irrational.	$\left. \begin{matrix} 1 \\ 2 \\ 1 \end{matrix} \right\} 4$	
15	a)	Arrange the numbers in ascending order 40, 54, 60, 68, 78	1	

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Qn No	Sub Qns	Answer Key/Value Points	Score	Total
		Median = 60	1	2
	b)	$M.D = \frac{1}{5} [140-60 + 160-60 + 168-60 + 178-60 + 154-60]$ $= \frac{20+0+8+18+6}{5}$ $= \frac{52}{5} = 10.4$	1 1 1	
16	a)	$A.M = \frac{2+4+6+8+10}{5} = \frac{30}{5} = 6$	1	4
	b)	$\text{Variance} = \frac{1}{5} [(2-6)^2 + (4-6)^2 + (6-6)^2 + (8-6)^2 + (10-6)^2]$ $= \frac{16+4+0+4+16}{5} = \frac{40}{5} = 8$ $S.D = \sqrt{8} = 2\sqrt{2}$ Remark: For formula of variance or S.D give one score	1 1 1	
17	a)	iv) 0	1	
	b) i)	{HHH, HHT, HTH, THH, TTH, THT, HTT, TTT}	1	
	ii)	$P(E_1) = \frac{6}{8} = \frac{3}{4}$	1	

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Qn No	Sub Qns	Answer Key/Value Points	Score	Total
		$P(E_2) = \frac{4}{8} = \frac{1}{2}$ $P(E_3) = \frac{7}{8}$ $P(E_1') = 1 - P(E_1)$ $= 1 - \frac{6}{8} = \frac{2}{8} = \frac{1}{4}$	 1 1 $\frac{1}{2}$ $\frac{1}{2}$	46

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1. Manjer.P.C Nanjur
2. J. John Victor Samy
3. Hareesh.S Hareesh
4. Sreeja.D S
5. George.K.A George
6. Muraleekrishnam. P.E Mr