


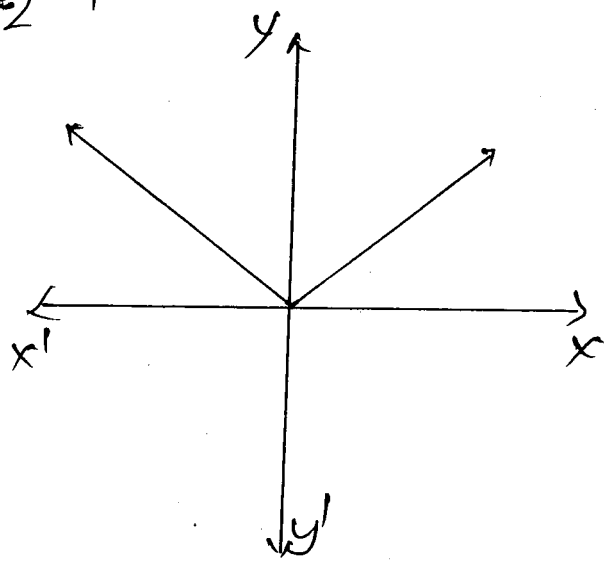
ANSWER KEY

IMPVT Oct
 FIRST YEAR HIGHER SECONDARY EXAMINATION ~~MARCH~~ 2022

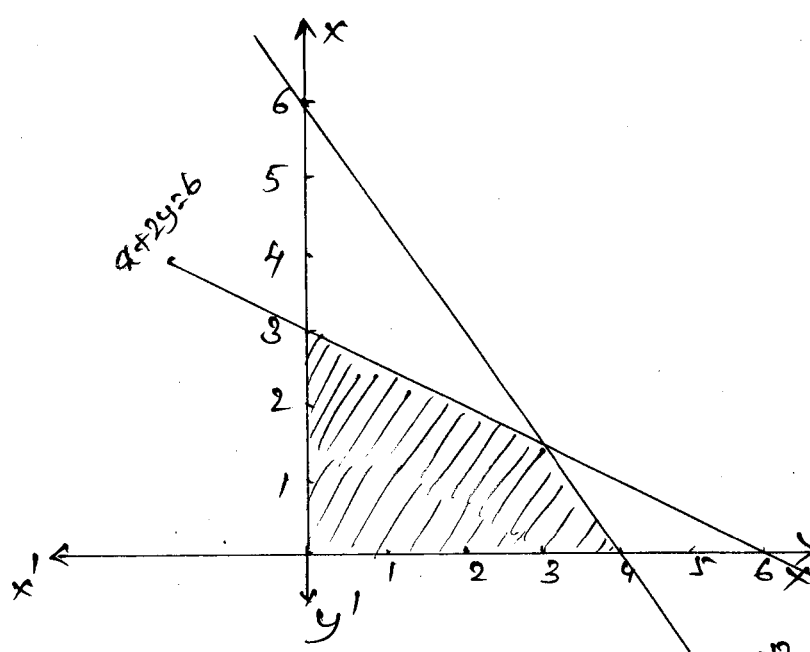
PART-I/II/III

SUBJECT: MATHEMATICS (HI)CODE NO: F4865VERSION: A60 SCORES2 HOURS

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
1.		$\phi, \{1\}, \{2\}, \{1, 2\}$		3
2.		$A \times B = \{(1, 3), (1, 4), (2, 3), (2, 4)\}$		3
3.	(a)	(iii) 180°	1	3
	(b)	(iv) 1	1	
	(c)	(i) $\operatorname{cosec} \alpha$	1	
4	(a)	(ii) -1	1	3
	(b)	$ z = \sqrt{a^2 + b^2}$	1	
		$= \sqrt{2^2 + 1^2} = \sqrt{5}$	1	
5.		$3x - 2x < 3 - 2$ $x < 1$	1	3
			1	
			1	
6		$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1} (x - x_1)$	1	3
		$(x_1, y_1) = (2, 1) \quad (x_2, y_2) = (3, 2)$	1	
		$y - 1 = \frac{2 - 1}{3 - 2} (x - 2)$ $y - 1 = x - 2$ $y = x - 1$	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
7.		$(h, k) = (0, 2) \quad r = 2$ $(x-h)^2 + (y-k)^2 = r^2$ $(x-0)^2 + (y-2)^2 = 4$ $x^2 + (y-2)^2 = 4$	1 1 1	3
8.	(a)	(i) (5, 0, 0)	1	
	(b)	2 nd	2	3
9.			4	
10.		$\text{L.S.} = \frac{2 \sin \frac{3x+\pi}{2} \cos \frac{3x-\pi}{2}}{2 \cos \frac{3x+\pi}{2} \cos \frac{3x-\pi}{2}}$ $= \frac{\sin 2x}{\cos 2x} = \tan 2x$	1+1 1+1	4
11.	(a)	$\text{L.S.} = 1 \quad \text{R.S.} = \frac{2}{2} = 1$ $P(1)$ true		
	(b)	Assume $P(k): 1+2+3+\dots+k = \frac{k(k+1)}{2}$ is true We will prove $P(k+1): 1+2+3+\dots+k+k+1 = \frac{(k+1)(k+2)}{2}$ is true $\text{L.S.} = \frac{k(k+1)}{2} + k+1 = (k+1) \left(\frac{k}{2} + 1 \right)$ $= (k+1) \frac{(k+1)+1}{2}$	1 1 1/2 1/2	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
12	(a)	$\therefore P(k+1)$ is true Hence $P(n)$ is true for all $n \in \mathbb{N}$ $Z_1 + Z_2 = 2+1 + 3i+2i$ $= 3+5i$	1 1	4
	(b)	$Z_1 - Z_2 = 2-1 + 3i-2i$ $= 1+i$	1 1	
13		$(1+x)^4 = 1 + 4C_1 \cdot x + 4C_2 \cdot x^2 + 4C_3 \cdot x^3 + 4C_4 \cdot x^4$ $= 1 + 4x + \frac{4 \cdot 3}{1 \cdot 2} x^2 + 4x^3 + x^4$ $= 1 + 4x + 6x^2 + 4x^3 + x^4$	2 1 1	4
14	(a)	$\frac{7!}{5!} = \frac{5! \times 6 \times 7}{5!} = 42$	1+1	4
	(b)	(ii) 1	1	
	(c)	(ii) 1	1	
15.	(a)	(ii) $\cos x$	1	4
	(b)	(iv) 1	1	
	(c)	(i) $2x$	1	
	(d)	(v) 0	1	
16.	(a)	$\sqrt{2}$ is not irrational	2	4
	(b)	If a number n is even, then n^2 is even	2	
17.	(a)	$S = \{1, 2, 3, 4, 5, 6\}$	1	4
	(b)	$E = \{2, 3, 5\}$	1	
	(c)	$P(E) = \frac{3}{6} = \frac{1}{2}$	2	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score												
18.	(a) (b) (c)	$A' = \{2, 4, 6\}$ $A \cup B = \{1, 3, 4, 5, 6\}$ $A \cap B = \{3\}$	2 2 2	6												
17.		$3x + 2y = 12$ $x + 2y = 6$ <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>x</td><td>0</td><td>4</td></tr> <tr><td>y</td><td>6</td><td>0</td></tr> </table> <table border="1" style="display: inline-table;"> <tr><td>x</td><td>0</td><td>6</td></tr> <tr><td>y</td><td>3</td><td>0</td></tr> </table>  <p>each line - 1 score x, y axis - 1 score Shaded region - 1 score</p>	x	0	4	y	6	0	x	0	6	y	3	0	1+1 4	6
x	0	4														
y	6	0														
x	0	6														
y	3	0														
20	(a) (b)	$a_5 = 4 \times 5 - 3 = 17$ $8 + 88 + 888 + \dots$ to n terms $= \frac{8}{9} (9 + 99 + \dots)$ $= \frac{8}{9} (10 \cdot 1 + 100 \cdot 1 + \dots)$ $= \frac{8}{9} (10 + 100 + 1000 + \dots - n)$ $= \frac{8}{9} \left(\frac{10(10^n - 1)}{10 - 1} - n \right)$	2 1 1 2	6												

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score																												
21	(a)	(ii) $y = 0$	1	6																												
	(b)	$(x_1, y_1) = (2, 5) \quad m = 2$	1																													
		$y - y_1 = m(x - x_1)$ $y - 5 = 2(x - 2)$ $y = 2x + 1$	1																													
	(c)	slope = $\tan 30 = \frac{1}{\sqrt{3}}$	1+1																													
22.		<table border="1" style="margin: 10px auto;"> <thead> <tr> <th>x_i</th> <th>f_i</th> <th>$f_i x_i$</th> <th>$f_i x_i^2$</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>5</td> <td>15</td> <td>45</td> </tr> <tr> <td>8</td> <td>10</td> <td>80</td> <td>640</td> </tr> <tr> <td>12</td> <td>11</td> <td>132</td> <td>1584</td> </tr> <tr> <td>15</td> <td>10</td> <td>150</td> <td>2250</td> </tr> <tr> <td>20</td> <td>4</td> <td>80</td> <td>1600</td> </tr> <tr> <td></td> <td>40</td> <td>457</td> <td>6119</td> </tr> </tbody> </table>	x_i	f_i	$f_i x_i$	$f_i x_i^2$	3	5	15	45	8	10	80	640	12	11	132	1584	15	10	150	2250	20	4	80	1600		40	457	6119	2	
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	40	457	6119																													
	(a)	mean, $\bar{x} = \frac{\sum f_i x_i}{\sum f_i}$ $= \frac{457}{40} = 11.425$	2																													
	(b)	Variance, $\sigma^2 = \frac{\sum f_i x_i^2}{\sum f_i} - (\bar{x})^2$ $= \frac{6119}{40} - (11.425)^2$ $= 152.98 - 130.53$ $= \underline{\underline{22.45}}$	2	6																												