ANSWER KEY

FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2025

PART-I/II/III

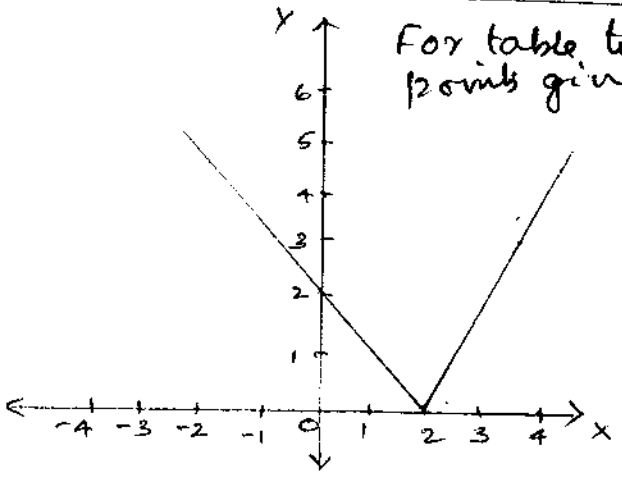
SUBJECT: MATHEMATICS (COMMERCE)

CODE NO: FY351 VERSION: A

60 SCORES 2 HOURS

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
1.	(i)	$A - B$	1	3
	(ii)	Subsets are $\{-1\}, \{0\}, \{1\}, \{-1,0\}, \{-1,1\}, \{0,1\}$ $\phi, \{-1,0,1\}$	2	
2.	(i)	$x-1=2 \Rightarrow x=3$ $y+2=1 \Rightarrow y=-1$	1	3
	(ii)	$A \times A = \{(0,0), (0,1), (1,0), (1,1)\}$.	1	
		$A \times A \times A = \{(0,0,0), (0,1,0), (1,0,0), (1,1,0)$ $(0,0,1), (0,1,1), (1,0,1), (1,1,1)\}$	1	
3.		M-2, A-2, T-2, H-1, E-1, I-1, C-1, S-1		3
		No of arrangements $= \frac{11!}{2!2!2!} = 4989600$	2	
		No of arrangement starts with H $= \frac{10!}{2!2!2!}$ $= 453600$	1	

Qn. N	Sub Qns	Answer Key/Value Points	Score	Total Score
4.	(i)	IV octant. or XOY'Z	1	
	(ii)	Distance: $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}$	1	3
		$= \sqrt{(4-2)^2+(3-3)^2+(1-5)^2}$	$\frac{1}{2}$	
		$= \sqrt{4+0+16} = \sqrt{20}$.	$\frac{1}{2}$	
5.	(i)	Centre: (2, 2)	1	
	(ii)	radius = 2		
		Equation of circle is		
		$(x-x_1)^2+(y-y_1)^2 = r^2$	1	3
		$(x-2)^2+(y-2)^2 = 2^2$	$\frac{1}{2}$	
		$x^2+y^2-4x-4y+4=0$.	$\frac{1}{2}$	
6.	(i)	$\lim_{x\to 0} \frac{\sin x}{x} = 1$	1	
	(ii)	$\lim_{x\to 0} \frac{\sin ax + bx}{ax} = \lim_{x\to 0}\left(\frac{\sin ax}{ax} + \frac{bx}{ax}\right)$	1	3
		$= \lim_{x\to 0}\left(\frac{\sin ax}{ax} + \frac{b}{a}\right)$	$\frac{1}{2}$	
		$= 1 + \frac{b}{a}$	$\frac{1}{2}$	
7.		$y = \frac{x-1}{x+2}$		
		$\frac{dy}{dx} = \frac{(x+2)\cdot\frac{d}{dx}(x-1) - (x-1)\frac{d}{dx}(x+2)}{(x+2)^2}$	1	
		$= \frac{(x+2)\times 1 - (x-1)\times 1}{(x+2)^2}$	1	3
		$= \frac{3}{(x+2)^2}$	1	

Qn. N	Sub Qns	Answer Key/Value Points	Score	Total Score
8	(i)	Mean $= \frac{5+7+6+9+4+11+8+6}{8}$		
		$= \frac{56}{8} = 7$.	1	
				3
	(ii)	$MD(\bar{x}) = \frac{\Sigma \lvert x_i - \bar{x} \rvert}{n}$		
		$= \frac{2+0+1+2+3+4+1+1}{8}$	2	
		$= \frac{14}{8} = \frac{7}{4}$		
9.	(i)	$A \cup A' = U$	1	
	(ii)	$A \cup B = \{2, 3, 4, 6\}$		
		$(A \cup B)' = \{1, 5\}$.	1	
		$A' = \{1, 5, 6\}$ $B' = \{1, 2, 5\}$.	1	4
		$A' \cap B' = \{1, 5\}$		
		$\therefore (A \cup B)' = A' \cap B'$ is verified.	1	
10	(i)	 For table to find points give 1 mark	2	4.
	(ii)	$f(x) = \frac{x-3}{x-4}$ $\Rightarrow x = \frac{4y-3}{y-1}$		
		Domain $= R - \{4\}$	2	
		Range $= R - \{1\}$.		

Qn. No.	Sub Qns	Answer Key/Value Points	Score	Total Score
11	(i)	$\sin^2\frac{\pi}{6} + \cos^2\frac{\pi}{3} - \tan^2\frac{\pi}{4}$		
		$= (\frac{1}{2})^2 + (\frac{1}{2})^2 - 1$	2	
		$= \frac{1}{4} + \frac{1}{4} - 1$		
		$= -\frac{1}{2}$		4
	(ii)	$\frac{\cos 7x + \cos 5x}{\sin 7x - \sin 5x} = \frac{2\cos(\frac{7x+5x}{2}).\cos(\frac{7x-5x}{2})}{2\cos(\frac{7x+5x}{2}).\sin(\frac{7x-5x}{2})}$	1	
		$= \frac{\cos x}{\sin x}$		
		$= \cot x$.	1	
12	(i)	$z = 3 - 4i \quad z^{-1} = \frac{1}{3-4i} = \frac{3+4i}{3^2+4^2}$	1+1	
		$= \frac{3}{25} + \frac{4}{25}i$		
	(ii)	$\frac{1+i}{1-i} = \frac{(1+i)(1+i)}{(1-i)(1+i)}$	1	
		$= \frac{1+2i-1}{1+1}$		4
		$= \frac{2i}{2}$	1	
		$= i = 0+1i$		
13	(i)	$\frac{2x-1}{3} \leq \frac{3x-2}{4}$	1	
		$8x - 4 \leq 9x - 6$		
		$8x - 9x \leq -6 + 4$	1	
		$-x \leq -2$		
		$x \geq 2$.	1	4

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
	(ii)		1	
14	(i)	b) $\frac{n!}{r!(n-r)!}$	1	
	(ii)	4 bowlers can be selected in $5C_4$ ways Remaining 7 players can be selected from 12 $\therefore$ $12C_7$ ways	1	
		$\therefore$ No of selections required Team		4
		$= 5C_4 \times 12C_7$	1	
		$= \frac{5!}{4!1!} \times \frac{12!}{7!5!}$		
		$= \frac{12\times11\times10\times9\times8}{4\times3\times2\times1}$	1	
		$= 3960$		
15	(i)	d) $n+1$	1	
	(ii)	$(\frac{x}{3} - \frac{1}{x})^5 = (\frac{x}{3})^5 - 5C_1(\frac{x}{3})^4(\frac{1}{x}) +$ $5C_2(\frac{x}{3})^3(\frac{1}{x})^2 - 5C_3(\frac{x}{3})^2(\frac{1}{x})^3 +$ $5C_4(\frac{x}{3})(\frac{1}{x})^4 - (\frac{1}{x})^5$	2	4
		$= \frac{x^5}{243} - \frac{5x^3}{81} + \frac{10x}{27} - \frac{10}{9x} + \frac{5}{3x^3}$ $- \frac{1}{x^5}$.	1	

Qn. N	Sub Qns	Answer Key/Value Points	Score	Total Score
16.	(i)	foci = $(\pm 5, 0)$ $\quad c = 5$ L. Major axis = 26 $\quad a = 13$ $b^2 = a^2 - c^2$ $b^2 = 169 - 25 = 144$ $b = 12$	1	
		L. of Minor axis = $2b = 24$.		
	(ii)	Length of Latus rectum = $\frac{2b^2}{a} = \frac{2 \times 144}{13}$ $= \frac{288}{13}$.		4
		Eccentricity : $e = \frac{c}{a} = \frac{5}{13}$.	2	
	(iii)	Equation of ellipse is $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ $\frac{x^2}{169} + \frac{y^2}{144} = 1$	1	
17	(i)	$a = 3 \quad r = 3 \quad S_n = 120$ $\Rightarrow a\frac{(r^n - 1)}{r-1} = 120$ $\Rightarrow 3\frac{(3^n - 1)}{3-1} = 120$ $\Rightarrow 3^n - 1 = 80$ $\Rightarrow 3^n = 81 \quad n = 4$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	
	(ii)	5^{th} term $= p \Rightarrow ar^4 = p$. 8^{th} term $= q \Rightarrow ar^7 = q$. 11^{th} term $= s \Rightarrow ar^{10} = s$.	1	
		Now $ps = ar^4 \cdot ar^{10} = a^2 r^{14}$ $= (ar^7)^2$ $= q^2 \quad \therefore q^2 = ps$	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
	(iii)	$a = 1 \quad r = \frac{1}{2}$	$\frac{1}{2}$	6
		$S_\infty = \frac{a}{1-r} = \frac{1}{1-\frac{1}{2}}$	1	
		$= 2$	$\frac{1}{2}$	
18.	(i)	d) $y = 0$	1	
	(ii)	Passing point (2, 3)		
		Slope of given line $= \frac{6-5}{-3-2} = \frac{1}{-5}$	$\frac{1}{2}$	
		Slope of required line $= 5$	$\frac{1}{2}$	
		∴ Equation of required line	1	
		$y - y_1 = m(x - x_1)$	$\frac{1}{2}$	
		$y - 3 = 5(x - 2)$	$\frac{1}{2}$	6
		$5x - y = 7$		
	(iii)	Distance of point (x_1, y_1) from $Ax + By + C = 0$		
		$= \left\lvert \frac{Ax_1 + By_1 + C}{\sqrt{A^2 + B^2}} \right\rvert$	1	
		∴ Distance $= \left\lvert \frac{4 \times 2 - 3 \times -1 - 1}{\sqrt{16+9}} \right\rvert$	$\frac{1}{2}$	
		$= \frac{10}{5}$	$\frac{1}{2}$	
		$= 2.$		
~~19~~				

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score

19 (i)

Class	f_i	x_i	f_ix_i	$(x_i-\bar{x})^2$	$f_i(x_i-\bar{x})^2$
30-40	3	35	105	729	2187
40-50	7	45	315	289	2023
50-60	12	55	660	49	588
60-70	15	65	975	9	135
70-80	8	75	600	169	1352
80-90	3	85	255	529	1587
90-100	2	95	190	1089	2178
	50		3100		10050

6

Mean $\bar{x} = \frac{\sum f_ix_i}{N} = \frac{3100}{50} = 62$ (2)

(ii) Variance $= \frac{\sum f(x_i-\bar{x})^2}{N}$

$= \frac{10050}{50}$ (3)

$= 201$

(iii) Standard Deviation: $\sqrt{6}$

$= \sqrt{201}$ (1)

$= 14.18$

(For Correct table 2 marks)

20. (i) $P(A) = \frac{2}{5}$ $P(B) = \frac{1}{2}$ $P(A \cap B) = \frac{1}{5}$ 1

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{2}{5} + \frac{1}{2} - \frac{1}{5}$

$= \frac{7}{10}$. 1

(ii) Total number of balls = 13

No of ways of selecting 3 balls out of 13 $= {}^{13}C_3$

Qn.	Sub Qns	Answer Key/Value Points	Score	Total Score
		No of ways of selecting 3 white balls out of 5 balls = $5C_3$		
		∴ Probability of selecting 3 white balls = $\frac{5C_3}{13C_3}$	1	6
	b)	No of ways of selecting 3 Red balls out of 8 = $8C_3$		
		Probability of selecting 3 Red balls = $\frac{8C_3}{13C_3}$	1	
	c)	No of ways of choosing One red and Two white balls = $8C_1 \times 5C_2$		
		Probability of selecting 1 red and 2 white balls = $\frac{8C_1 \times 5C_2}{13C_3}$	2	

1. Ravendiam. M.P 9847559383
2. MANOJKUMAR. P 9447236285
3 DHANYA. S 9400516005

ANSWER KEY

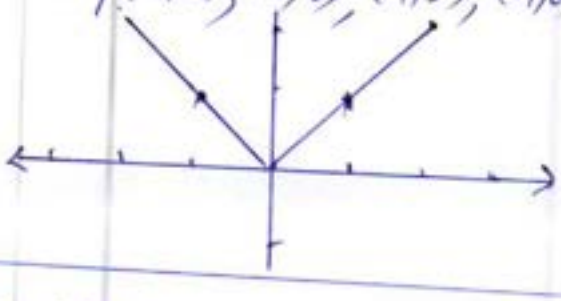
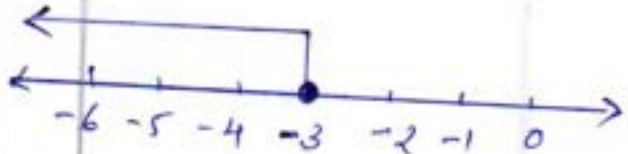
First YEAR HIGHER SECONDARY EXAMINATION ... March ... 2025

PART ~~I/II~~/III

SUBJECT: MATHEMATICS (COMMERCE)

CODE NO: FY 355 VERSION: D

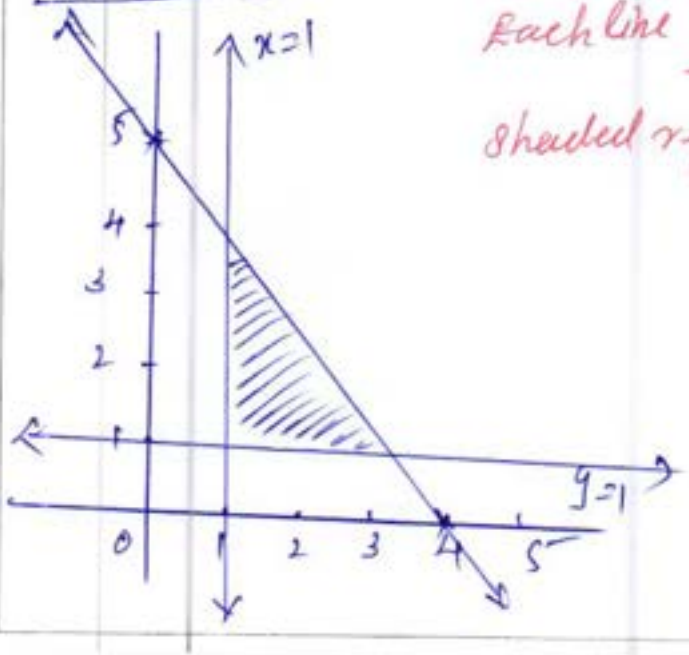
80 SCORES 2½ HOURS

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
1	(a)	(B) $[2,5)$	1	3
	(b)	$\phi, \{1\}, \{2\}, \{1,2\}$	½+½+½+½	
2	(a)	$A \times B = \{(3,5), (3,6), (4,5), (4,6)\}$	1	3
	(b)		2	
3	(a)	(A) 300	1	3
	(b)	$\cos x = -\frac{4}{5}$	1	
		$\tan x = -\frac{3}{4}$	1	
4	(a)	$3x - 3 \leq 2x - 6$	1	3
		$3x - 2x \leq -6 + 3$	½	
		$x \leq -3$	½	
	(b)		1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
5	(a)	(A) 1	1	
	(b)	$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$	½	
		$= \frac{-3 \pm \sqrt{9-4\times1\times5}}{2\times1}$	½	3
		$= \frac{-3 \pm \sqrt{-11}}{2}$	½	
		$= \frac{-3 \pm i\sqrt{11}}{2}$	½	
6		x_i | $\lvert x_i - \bar{x}\rvert$ 3 | 7 6 | 4 8 | 2 9 | 1 13 | 3 14 | 4 17 | 7 $\Sigma x_i = 70$ | $\Sigma \lvert x_i - \bar{x}\rvert = 28$		
		$\text{Mean}(\bar{x}) = \frac{\Sigma x_i}{n}$	½	
		$= \frac{70}{7}$	1	3
		$= 10$		
		$MD(\bar{x}) = \frac{\Sigma \lvert x_i - \bar{x}\rvert}{n}$	½	
		$= \frac{28}{4} = 7$	1	
7	(a)	$P(\text{not } A) = 1 - P(A) = 1 - 0.42 = 0.58$	½ + ½	
	(b)	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$	1	3
		$= 0.42 + 0.48 - 0.16$	1	
		$= 0.74$		
8	(a)	A	1	
	(b)	$A - B = \{1, 2\}$	1	
	(c)	$n(X \cap Y) = n(X) + n(Y) - n(X \cup Y)$	1	4
		$= 17 + 23 - 38$	1	
		$= 2$		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
9	(a)	$x+3=4$	½	
		$x=1$	½	
		$y-1=2$	½	4
		$y=3$	½	
	(b)	$R=\{(1,2),(2,3),(3,4),(4,5),(5,6)\}$	1	
		Domain $=\{1,2,3,4,5\}$	½	
		Range $=\{2,3,4,5,6\}$	½	
10	(a)	$\sin x$	1	
	(b)	$\frac{\sin 5x+\sin 3x}{\cos 5x+\cos 3x} = \frac{2\sin\frac{5x+3x}{2}\cos\frac{5x-3x}{2}}{2\cos\frac{5x+3x}{2}\cos\frac{5x-3x}{2}}$	1	4
		$= \frac{\sin 4x}{\cos 4x}$	1	
		$= \tan 4x$	1	
11		$P(1): 1 = \frac{3^1-1}{2} = 1 \quad \therefore P(1)$ is true.	1	
		$P(k): 1+3+3^2+\cdots+3^{k-1} = \frac{3^k-1}{2}$	1	
		$P(k+1): 1+3+3^2\cdots+3^{k-1}+3^k$		4
		$= \frac{3^k-1}{2}+3^k$	½	
		$= \frac{3^{k+1}-1}{2}$	½	
		$\therefore P(k+1)$ is true.	1	
12	(a)	$\sqrt{3}-i$	1	
	(b)	$r=\lvert z\rvert=\sqrt{3+1}=2$	½	4
		$\theta=\tan^{-1}(1/\sqrt{3})=\pi/6$	½	
		$z=r(\cos\theta+i\sin\theta)$	1	
		$z=2(\cos\pi/6+i\sin\pi/6)$	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
13	(a)	1	1	
	(b)	$n = 10$	1	4
	(c)	$^4P_3 = 4 \times 3 \times 2 = 24$	1+1	
14		$(a+b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$	1	
		$(a-b)^4 = a^4 - 4a^3b + 6a^2b^2 - 4ab^3 + b^4$	½	
		$(a+b)^4 - (a-b)^4 = 8a^3b + 8ab^3$	½	4
		$= 8ab(a^2+b^2)$	½	
		$(\sqrt{3}+\sqrt{5})^4 - (\sqrt{3}-\sqrt{5})^4 = 8\sqrt{3}\sqrt{5}(3+5)$	1	
		$= 64\sqrt{15}$	½	
15		$S_n = 4 + 44 + 444 + \ldots$ to n terms		
		$= 4(1 + 11 + 111 + \ldots$ to n terms)	½	
		$= \frac{4}{9}(9 + 99 + 999 + \ldots$ to n terms)	1	
		$= \frac{4}{9}[(10-1) + (100-1) + (1000-1) + \ldots$ to n terms]	1	4
		$= \frac{4}{9}[10 + 100 + 1000 + \ldots$ to n terms $- n]$	½	
		$= \frac{4}{9}\left[\frac{10(10^n-1)}{9} - n\right]$	1	
16	(a)	(C) (1, 2, 0)	1	
	(b)	$AB = \sqrt{1+1+16} = \sqrt{18}$	1	
		$AC = \sqrt{16+4+16} = \sqrt{36}$	½	4
		$BC = \sqrt{9+9+0} = \sqrt{18}$	½	
		$AB^2 + BC^2 = 18 + 18 = 36 = AC^2$	1	
		$\therefore \Delta ABC$ is right triangle.		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
17	(a)	$\sqrt{5}$ is complex number	1	
	(b)	$\sqrt{3}$ is rational	½	
		$\sqrt{3} = a/b$ where $a, b \in Z$ have no common factors	½	4
		$a^2 = 3b^2 \Rightarrow$ 3 divides a	½	
		$a = 3c$		
		$b^2 = 3c^2 \Rightarrow$ 3 divides b	½	
		3 is a multiple of both a and b.	½	
		which is a contradiction to our assumption	½	
18	(a)	$A' = \{1, 3, 5, 7\}$	1	
		$B' = \{1, 2, 6, 7\}$	1	
	(b)	$A \cup B = \{2, 3, 4, 5, 6\}$	1	6
		$(A \cup B)' = \{1, 7\}$	1	
	(c)	$A' \cap B' = \{1, 7\}$	1	
		$\therefore (A \cup B)' = A' \cap B'$	1	
19		$5x + 4y = 20$ x: 0, 4 y: 5, 0  	x and y and −1 Table −1 Each line 1 score each − 3 Shaded region −1		6

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
20	(a)	(A) $-\frac{3}{4}$	1	
	(b)	$3x+4y=12$	1/2	
		$\frac{x}{4}+\frac{y}{3}=1$	1/2	
		x intercept $=4$	1	
		y intercept $=3$	1	6
	(c)	$(x_1, y_1)=(1,2)$, slope $=\frac{-3}{4}$		
		equation of $\parallel^{el}$ line is		
		$y-y_1=m(x-x_1)$	1	
		$y-2=\frac{-3}{4}(x-1)$	1	
21	(a)	(A) 8	1	
	(b)	(i) $c^2=a^2-b^2=16-9=7$	1/2	
		$c=\sqrt{7}$	1/2	
		foci $=(\pm c, 0)=(\pm\sqrt{7}, 0)$	1	6
		(ii) vertices $=(\pm a, 0)=(\pm 4, 0)$	1	
		(iii) length of major axis $=2a=8$	1	
		length of minor axis $=2b=6$	1	
22	(a)	$\sec^2 x$	1	
	(b)	$f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$	1/2	
		$=\lim_{h\to 0}\frac{\sin(x+h)-\sin x}{h}$	1/2	
		$=\lim_{h\to 0}\frac{2\cos\left(\frac{2x+h}{2}\right)\sin h/2}{h}$	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		$= \lim_{h\to 0} \cos\left(\frac{2x+h}{2}\right) \frac{\sin h/2}{h/2}$	½	
		$= \cos x$	½	6
	(c)	$y = x\sin x$		
		$\frac{dy}{dx} = x\frac{d}{dx}(\sin x) + \sin x \frac{d}{dx}(x)$	1	
		$= x\cos x + \sin x$	1	
23		class x_i f_i $f_i x_i$ $f_i x_i^2$		
		0-10 5 4 20 100		
		10-20 15 7 105 1575		
		20-30 25 16 400 10000		
		30-40 35 16 560 19600		
		40-50 45 7 315 14175	2	
		$\sum f_i = 50$ $\sum f_i x_i = 1400$ $\sum f_i x_i^2 = 45450$		6
		$\text{Mean}(\bar{x}) = \frac{\sum f_i x_i}{N}$	1	
		$= \frac{1400}{50}$		
		$= 28$	1	
		$\text{Var}(x) = \frac{\sum f_i x_i^2}{N} - (\bar{x})^2$	1	
		$= \frac{45450}{50} - (28)^2$		
		$= 909 - 784 = 125$	1	

8/8

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
24	(a)	1	1	
	(b)	(i) $S = \{HH, HT, TH, TT\}$	1	
		(ii) $A = \{HH, HT\}$	1	
		$B = \{TT\}$	1	6
		(iii) $P(A) = \frac{2}{4} = \frac{1}{2}$	1	
		$P(B) = \frac{1}{4}$	1	