

Question Number	Scheme	Marks
2. (a)		B1 B1 B1 B1 (4)
(b)	Since no family has a dog and a rabbit a mutually exclusive pair is D, R	B1 (1)
(c)	$\frac{2+4}{40} = \frac{3}{20}$	B1ft (1)
(d)	e.g. $P(D \cap C) = \frac{2}{40} = \frac{1}{20}$ $P(D) = \frac{12}{40} = \frac{3}{10}$ $P(C) = \frac{14}{40} = \frac{7}{20}$ <u>or</u> $\frac{1}{20} \neq \frac{3}{10} \times \frac{7}{20} = \left[\frac{21}{200}\right]$ so they are <u>not</u> independent	M1 A1 (2)
ALT	$P(C) = \frac{14}{40} = \frac{7}{20}$ vs $P(C D) = \frac{2}{12} = \frac{1}{6}$ <u>or</u> $P(D) = \frac{12}{40} = \frac{3}{10}$ vs $P(D C) = \frac{2}{14} = \frac{1}{7}$	(2)
(e)	e.g. $[P(R C)] = \frac{P(R \cap C)}{P(C)}$ or $\frac{\frac{4}{40}}{\frac{14}{40}}$ $= \frac{4}{14} = \frac{2}{7}$	M1 A1ft (2)
(f)	$\frac{"10"+"7"}{"10"+"7"+9}$ (o.e.) ; $= \frac{17}{26}$ (accept 0.6538461)	M1; A1 (2)
		[12]

4. (a)(i)	$x + 0.1$ $[P(x + 0.1) \text{ is } B0]$	B1
(ii)	$P(B A) = \frac{P(B \cap A)}{P(A)} = \frac{0.1}{x + 0.1}$	M1 A1 (3)
(b)	$x + y + 0.1$ (o.e.) $[P(x + y + 0.1) \text{ is } B0]$	B1 (1)
(c)	$x + y + 0.1 + 0.32 = 1$ <u>or</u> $x + y + 0.1 = 0.68$ <u>or</u> "(b)" + 0.32 = 1 o.e. $x + 0.1 = 2(y + 0.1)$ Eliminating x gives $3y = 0.48$ $x = \underline{0.42}$ $y = \underline{0.16}$	M1 M1 M1 A1 A1 (5)
		(9 marks)

Question Number	Scheme	Marks
6(a)	$P(V > 104.9) = P\left(Z > \frac{104.9 - 100}{2.5}\right)$	M1
	$= 1 - 0.975$	M1
	$= 0.0250$	0.025 or awrt 0.0250 A1
		(3)
(b)	Expected number = $150 \times "0.025"$	M1
	$= 3.75$	awrt 3.75 A1
		(2)
(c)	$[P(V > v V < 104.9)] = \frac{P(v < V < 104.9)}{P(V < 104.9)} = 0.2801$	M1
	$P(v < V < 104.9) = (1 - "0.025") - P(V < v)$	M1
	$P(V < v) = (1 - "0.025") - (1 - "0.025") \times 0.2801 [=0.7019] \text{ oe}$	dM1
	$\frac{v - 100}{2.5} = 0.53$	M1A1
	$v = 101.325$	awrt 101.32 or awrt 101.33 A1
		(6)

Question Number	Scheme	Marks
4. (a)	$P(W < 120) = P\left(Z < \frac{120 - 165}{35}\right)$	M1
	$= P(Z < -1.2857...) = 1 - 0.9015 \text{ or } 1 - 0.9007285...$	M1
	$= 0.09927... = \text{awrt } \underline{0.0985-0.0994}$	A1 (3)
(b)	e.g. $P(W > x) = \frac{1}{3}$ gives $\frac{x - 165}{35} = \pm 0.43$ (calculator 0.430727...)	M1B1
	Limits 149.9245... to 180.0754... awrt 150 to 180	A1, A1 (4)
(c)	$P(W < 200 W > "180") \text{ or } \frac{P("180" < W < 200)}{P(W > "180") \text{ or } \frac{1}{3}}$	M1
	$= \frac{0.8413(44739...) - \frac{2}{3}}{\frac{1}{3}}$	A1 (num)
	$= 0.52403... \text{ } \underline{(0.523-0.5264)}$	A1 (3)
(d)	$\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} \times 3!$	M1;M1
	$= \underline{\frac{2}{9}}$	A1 (3)
		[13 marks]