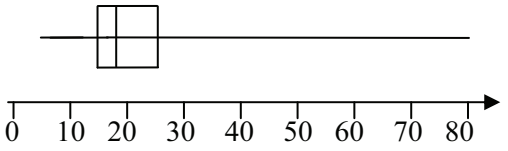
1	**(i)** $z = 0.38$	B1		$\pm 0.38\,(0)$ seen or implied
	$\pm\dfrac{25-\mu}{\mu/3} = 0.38$	M1		Standardising attempt resulting in z = some μ/σ/both, no continuity correction
		M1		Substituting to eliminate μ or σ and attempt to solve linear equation
	$\mu = 22.2,\ \sigma = 7.40$	A1	[4]	Both correct
	(ii) $\text{P}(4) = {}^6\text{C}_4(0.352)^4(0.648)^2$	M1		${}^6\text{C}_r \times (\text{p})^r \times (1-\text{p})^{6-r}$, $r = 2$ or 4
	$= 0.0967$	A1	[2]	Correct answer
2	**(i)** $\text{P}(F) = \dfrac{12}{30}\ (0.4)$	B1		$\dfrac{12}{30}$ or $\dfrac{16}{30}$ or $\dfrac{5}{30}$ seen
	or $\text{P}(W) = \dfrac{16}{30}\ (0.533)$	M1		Valid attempt to find P(F or W)
	or $\text{P}(M \cap W') = \dfrac{5}{30}\ (0.167)$			
	$(F \text{ or } W) = \dfrac{13}{30} + \dfrac{3}{30} + \dfrac{9}{30}$	A1		Correct unsimplified expression
	or $1 - \dfrac{5}{30}$ or $\dfrac{12}{30} + \dfrac{16}{30} - \dfrac{3}{30}$			
	$= \dfrac{5}{6}\ (0.833)$	A1	[4]	Correct answer
	(ii) P(M) = 18/30 (0.6), P(W) = 16/30 (0.533), P(M) × P(W) = 8/25 (0.32)	M1		Valid attempt to find P(M), P(W) and P(M) × P(W)
	P(M and W) = 13/30 (0.433) ≠ 8/25 (0.32) not independent	A1		P(M and W) = 13/30 ≠ 8/25 and correct conclusion
	OR			
	$\text{P}(M \mid W) = \dfrac{\text{P}(M \text{ and } W)}{\text{P}(W)} = \dfrac{13/30}{16/30} = \dfrac{13}{16}\ (0.813)$	M1		Valid attempt to find P(M and W), P(W) and P(M and W) ÷ P(W)
	$\neq \dfrac{18}{30} = \text{P}(M)$, not independent	A1		$\dfrac{13}{16} \neq \dfrac{18}{30} = \text{P}(M)$
	OR			
	$\text{P}(W \mid M) = \dfrac{\text{P}(M \text{ and } W)}{\text{P}(W)} = \dfrac{13/30}{18/30} = \dfrac{13}{18}$	M1		Valid attempt to find P(M and W), P(M) and P(M and W) ÷ P(M)
	$\neq \dfrac{16}{30} = \text{P}(W)$, not independent	A1	[2]	$\dfrac{13}{16} \neq \dfrac{18}{30} = \text{P}(M)$

3	**(i)** P(3m) = 4/5 (0.8) P(5m) = 1/5 (0.2)	B1		P(3m) = 4/5 or P(5m) = 1/5 seen or implied
	E(X) = 17/5 (3.4)	B1		Correct E(X)
		M1		Subtract their mean^2 numerically from Σx^2p, no extra dividing
	Var(X) = 16/25 (0.64)	A1	[4]	Correct answer
	(ii) P(3, 5) + P(5, 3) = 0.8 × 0.2 +0.2 × 0.8	M1		Summing two 2-factor terms
	= 8/25 (0.32)	A1√	[2]	Correct answer, ft on 2 × p × (1 − p), their p
	(iii) P(11) = P(3, 3, 5) + P(3, 5, 3) + P(5, 3, 3)	M1		Mult 2 probs for 3 with 1 prob for 5
	= (4/5 × 4/5 × 1/5) × 3	M1		Multiplying probs for 11 by 3 or summing 3 options
	= 48/125 (0.384)	A1	[3]	Correct final answer
4	**(i)** 3! × 4! × 8! × 3!	M1		Multiplying 3 factorials together
		M1		Multiplying by 3!
	= 34 836 480 (34 800 000)	A1	[3]	Correct answer
	(ii) $^3C_2 \times {}^4C_2 \times {}^8C_2$	M1		Multiplying (only) 3 combinations together
	= 504	A1	[2]	Correct answer
	(iii) Fr Fa H			
	3 1 2 = $^8C_3 \times {}^3C_1 \times {}^4C_2 = 1008$	M1		Multiplying 3 combinations, only
	3 2 1 = $^8C_3 \times {}^3C_2 \times {}^4C_1 = 672$	M1		Summing 3 options
	4 1 1 = $^8C_4 \times {}^3C_1 \times {}^4C_1 = 840$	A1		3 correct combination answers
	total ways = 2520	A1	[4]	Correct answer
5	**(i)** LQ = 15, Median = 18, UQ = 26	B1		LQ = 15, Median = 18, and UQ = 26
		B1		Linear scale and labels
		B1√		Quartiles and median box, ft on their values, but M − LQ < UQ − M
		B1√		Whiskers from 5 to LQ and UQ to 80, ft on their values
			[4]	
	(ii) most (3/4) are earning less than 26K, not many earning high salaries, etc	B1	[1]	Any sensible answer
	(iii) **(a)** IQ range = 11	B1		IQR = 11
	high outlier is above 26 + 1.5 × 11	M1		Their UQ + 1.5 × their IQ range
	= 42500 euros	A1	[3]	Correct answer
	(b) Low outlier is below 15 – 1.5 × 11 = –1.5	B1√	[1]	Correct reason, must involve subtraction, ft on their LQ and 1.5 × their IQR

6	**(i)** $P(O \text{ given } +) = \frac{0.37}{0.83}(0.4458)$	B1 A1 M1		0.83 seen or implied Attempt to find P(O given +) using conditional probability fraction Binomial term ${}^9C_r p^r(1-p)^{9-r}$, $r \neq 0$ or 9
	$P(0, 1, 2) = (0.4458)^0(0.5542)^9 + {}^9C_1(0.4458)^1(0.5542)^8 + {}^9C_2(0.4458)^2(0.5542)^7$	M1 A1		Binomial expression P(0, 1, 2) or P(0, 1, 2, 3) powers summing to 9 any $0 < p < 1$ Correct unsimplified expression
	$= 0.156$	A1	[6]	Correct final answer
	(ii) $\mu = 150 \times 0.35 = 52.5,$	B1		150×0.35 (52.5) and $150 \times 0.35 \times 0.65$ (34.125) seen
	$\sigma^2 = 150 \times 0.35 \times 0.65 = 34.125$	M1 M1		Standardising, using sd not variance Using continuity correction, 59.5 or 60.5
	$P(> 60.5) = P\left(z > \pm \frac{60.5 - 52.5}{\sqrt{34.125}}\right)$	M1		correct area (< 0.5, for mean < their 60)
	$= 1 - \Phi(1.369)$			
	$= 0.0854$ or 0.0855	A1	[5]	correct value