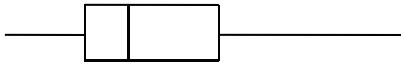
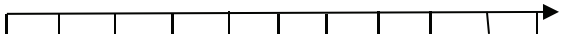
1	mean = $(5 + (–2) + 12 + 7 + (–3) + 2 + (–6) + 4 + 0 + 8) / 10$ $= 2.7$ var = $(5^2 + (–2)^2 + \ldots + 8^2) / 10 – 2.7^2 =$ $35.1 – 2.7^2$ $= 27.8$	B1 M1 A1 **3**	 Subst in correct var formula must have $– \text{mean}^2$ Correct answer
2	**(i)** $0.24 + 0.35 + 2k + k + 0.05 = 1$ $k = 0.12$	M1 A1 **2**	Summing probs = 1 Correct answer
	(ii) model number is 1	B1 **1**	
	(iii) mean = $1 \times 0.35 + 2 \times 0.24 + 3 \times 0.12 + 4 \times 0.05$ P(>1.39) = P(2, 3, 4) = 0.41	B1 M1 B1 **3**	1.39 seen Finding P(X > their mean) Correct ans following mean or mode only
3	P(8) = P(H 4 4) + P(T 2 4) + P(T 4 2)	M1	$\frac{1}{3}$ or $\frac{2}{3}$ mult by dice related prob, seen anywhere
	$= \frac{1}{3}\times\frac{1}{16}+\frac{2}{3}\times\frac{1}{16}+\frac{2}{3}\times\frac{1}{16}$	M1	Summing two or three 2-factor probs involving $\frac{1}{3}$ and $\frac{2}{3}$
	$= \frac{5}{48}$	A1	$\frac{5}{48}$ oe seen as num or denom of a fraction
	$\text{P(H} \mid \text{8)} = \frac{P(H \cap 8)}{P(8)}$	B1	$\frac{1}{48}$ oe seen as num or denom of a fraction
	$= \frac{\frac{1}{48}}{\frac{5}{48}} = \frac{1}{5}$	A1 **5**	Correct ans
4	**(i)** median A = 0.52 LQ = 0.41 UQ = 0.79	B1 B1 B1ft **3**	 ft wrong units
	(ii)		
	A 	B1	2 correct boxes ft (i) OK if superimposed
	B 	B1	2 pairs correct whiskers lines up to box not inside
	 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 Time in secs	B1 **3**	Correct uniform scale need at least 4 values on it. No scale no marks unless perfect A and B with all 10 values shown, in which case score B1B1B0

	(iii)	Smartphone *B* is quicker, slightly less variable, etc.	B1	**1**	oe sensible answer
5	**(i)**	1.2 = 15p p = 0.08 Var = *npq* = 15 × 0.08 × 0.92 = 1.104 **AG**	M1 A1	**2**	Attempt to find *p* using 1.2 = 15*p* Correct answer
	(ii)	P(0, 1, 2) = $(0.92)^{15} + {}^{15}C_1(0.08)(0.92)^{14} + {}^{15}C_2(0.08)^2(0.92)^{13}$ = 0.887	M1 M1 A1	**3**	Binomial expression ${}^{15}C_x p^x(1–p)^{15–x}$ $0 < p < 1$ Correct unsimplified expression for P(0, 1, 2) Correct answer
	(iii)	P(at least 1 faulty screw) = 1 – P(0) = 1 – $(0.92)^{15}$ = 0.7137… P(at least 1 faulty screw in 7 packets) = ${}^8C_7(0.713…)^7(0.2863…)$ = 0.216	M1 A1 M1 A1	**4**	Attempt at P(0) or 1 – P(0) Rounding to 0.71 Binomial expression ${}^8C_7 p^7(1–p)$ $0 < p < 1$ Correct answer
6	**(i)**	$z_1 = \dfrac{70 - 66.4}{5.6} = 0.6429$ $z_2 = \dfrac{72.5 - 66.4}{5.6} = 1.089$ $\Phi(1.089) - \Phi(0.643) = 0.8620 - 0.7399$ = 0.1221 0.1221 × 250 = 30.5 30 or 31 sheep	M1 M1 A1 M1 A1ft	**5**	Standardising one variable, no cc, no sq rt Correct area $\Phi_2 - \Phi_1$ Correct answer rounding to 0.12 Mult by 250 Correct answer ft their 0.1221
	(ii)	66.4 – 59.2 = 7.2 66.4 + 7.2 = 73.6	M1 A1	**2**	Subt from 66.4 Correct answer
	(iii)	$z = 0.674$ $\dfrac{67.5 - \mu}{4.92} = 0.674$ $\mu = 64.2$	B1 M1 A1	**3**	± 0.674 or 0.675 seen Standardising with a *z*-value no cc no sq rt Correct answer
7	**(i)**	W(8) M(5) 4 2 = ${}^8C_4 \times {}^5C_2 = 700$ 5 1 = ${}^8C_5 \times {}^5C_1 = 280$ 6 0 = ${}^8C_6 \times {}^5C_0 = 28$ Total = 1008	M1 M1 A1 A1	**4**	Mult 2 combs, ${}^8C_x \times {}^5C_y$ Summing 2 or 3 options 2 correct options unsimplified Correct answer
	(ii)	M1 and MMWWW = ${}^3C_2 \times {}^8C_3 = 168$ M2 and MMWWW = ${}^3C_2 \times {}^8C_3 = 168$ Neither and MMMWWW = ${}^3C_1 \times {}^8C_3 = 56$ Total = 392 OR total, no restrictions = ${}^5C_3 \times {}^8C_3 = 560$ M1M2 and MWWW = ${}^3C_1 \times {}^8C_3 = 168$ 560 – 168 = 392	M1 B1 A1 M1 B1 A1	**3**	Summing 3 options One correct option Correct answer Subt 2 men together from no restrictions One correct of 560 or 168 Correct answer

(iii)	e.g. WWMWWW = 5! (women) × 4 = 480	M1 M1 A1	**3**	5! Seen mult by integer ⩾ 1 Mult by 4 Correct answer
	OR 6! – MWWWWW – WWWWWM = 6! – 5! – 5! = 480	M1 M1 A1		6! seen with a subtraction 5! or 2 × 5! Seen subtracted Correct answer