Worked Solutions

Edexcel S1 Paper A

1. (*a*) $d = 1 - (0.1 + 0.2 + 0.3 + 0.1) = 0.3$ **(1)**

(*b*) $P(-1 \leq X < 2) = 0.2 + 0.3 + 0.3 = 0.8$ **(2)**

(*c*) $E(X) = (-2 \times 0.1) + (-1 \times 0.2) + 0 + (1 \times 0.3) + (2 \times 0.1) = 0.1$ **(2)**

(*d*) $E(3X + 2) = 3 \times 0.1 + 2 = 2.3$ **(2)**

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2. (*a*) $\bar{t} = \dfrac{72}{106} = 0.6792$ **(2)**

(*b*) $S_t = \sqrt{\dfrac{172}{106} - 0.6792^2} = 1.078$ **(3)**

(*c*) $\bar{S} = 4t + 34 = 36.72, \qquad S_s = 4 \times S_t = 4.31$ **(4)**

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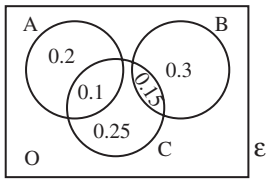
3. (*a*) exclusive events cannot happen at the same time exhaustive events cover all possibilities between them **(2)**

(*b*)



(4)

(*c*) $P(B) = 0.3 + 0.15 = 0.45$ **(2)**

(*d*) $P(B \cup C) = 0.3 + 0.15 + 0.25 + 0.1 = 0.8$ **(2)**

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4. $X \sim N(30, 3.5^2)$

(*a*) $P(X < 28) = \Phi\left(\dfrac{28 - 30}{3.5}\right) = 0.2843$ **(4)**

(*b*) $P(X > 33) = 1 - \Phi\left(\dfrac{33 - 30}{3.5}\right) = 0.1949$ **(3)**

(*c*) $\Phi\left(\dfrac{x - 30}{3.5}\right) = 0.95 \quad \Rightarrow \dfrac{x - 30}{3.5} = 1.645.$

$\Rightarrow x = 30 + 3.5 \times 1.645 = 35.76$

$\therefore$ needs to leave home 36 mins earlier

$8:45 - 36$ mins $\hat{=}$ 8 : 09 a.m. **(3)**

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5. (*a*)

0	1	2	3	4	5	5	5	5	6	7	8	9	
1	0	0	1	1	2	2	3	4	5	5	6	6	8
2	1	2											
3	0	2											
4													
5	2												

Key 1|4 = 14 years **(3)**

(*b*) 5 years **(1)**

(*c*) median – average of 15th and 16th values $\dfrac{11 + 11}{2} = 11$ years.

Q_1, 8th value, 5 years.

Q_3, 23rd value, 16 years. **(6)**

(*d*) Positively skewed. **(1)**

(*e*) As mode < median < mean also shows positive skew **(1)**

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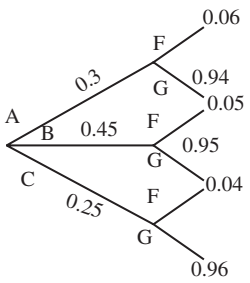
6. (*a*) **(4)**



(*b*) $P(\text{Faulty}) = (0.3 \times 0.06) + (0.45 \times 0.05) + (0.25 \times 0.04) = 0.0505$ **(3)**

(*c*) $P(B|F) = \dfrac{P(B \cap F)}{P(F)} = \dfrac{0.45 \times 0.05}{0.0505} = 0.4455$ **(2)**

(*d*) $P(A \cup C|G) = \dfrac{(0.3 \times 0.94) + (0.25 \times 0.96)}{1 - 0.0505} = 0.5498$ **(3)**

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7. $\Sigma f = 720 \quad \Sigma f^2 = 81600 \quad \Sigma y = 1248 \quad \Sigma y^2 = 196774$
$\Sigma fy = 117280$

$$S_{ff} = 81600 - \frac{(720)^2}{8} = 16800$$

$$S_{fy} = 117280 - \frac{720 \times 1248}{8} = 4960$$

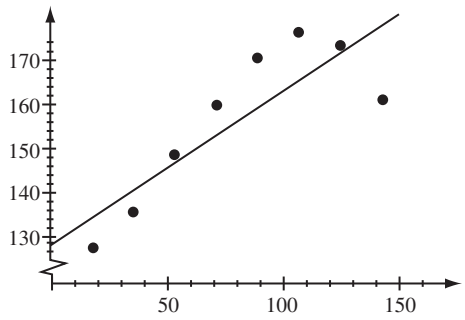
(*a*) Scatter graph. **(3)**

(*b*) $b = \dfrac{4960}{16800} = 0.295$

$$a = \frac{1248}{8} - 0.295\left(\frac{720}{8}\right) \simeq 129., \quad y = 129 + 0.295f$$ **(7)**

(*c*) line. **(2)**

(*d*) *a* – shows that with no fertilizer you could expect a crop of 129 tomatoes
b – for each extra 10 ml of fertilizer expect an extra 3 tomatoes. **(2)**



(*e*) No – only safe in limits given, actually has started to decline. **(1)**
