

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)

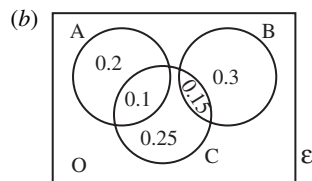
(d) $E(3X + 2) = 3 \times 0.1 + 2 = 2.3$ (2)

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

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

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

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



(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)

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

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

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

(c) $\Phi\left(\frac{x - 30}{3.5}\right) = 0.95 \Rightarrow \frac{x - 30}{3.5} = 1.645$
 $\Rightarrow x = 30 + 3.5 \times 1.645 = 35.76$

\therefore needs to leave home 36 mins earlier

$8:45 - 36 \text{ mins} \approx 8:09 \text{ a.m.}$ (3)

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 $\frac{11 + 11}{2} = 11$ years.

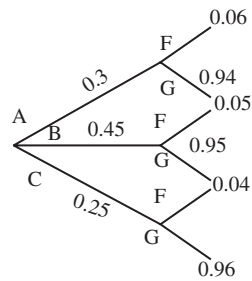
Q_1 , 8th value, 5 years. (6)

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

(d) Positively skewed. (1)

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

6. (a)



(4)

(a) Scatter graph.

(3)

$$(b) b = \frac{4960}{16800} = 0.295$$

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

(c) line.

(2)

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

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

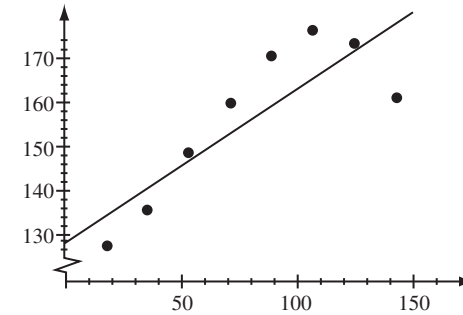
$$(c) P(B|F) = \frac{P(B \cap F)}{P(F)} = \frac{0.45 \times 0.05}{0.0505} = 0.4455 \quad (2)$$

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

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

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

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



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

(1)