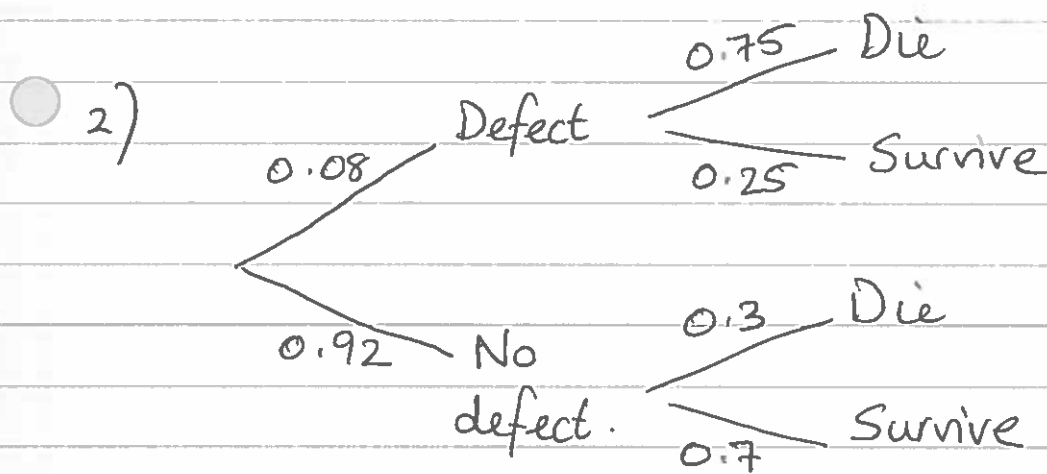


## Unit Practice Test Answers 2.

1) The data is continuous as it is distances which have been taken to the nearest cm.

b) The upper fence 116.5 and so 117 is an outlier. There are no outliers at the lower fence.



$$P(\text{die}) = (0.08 \times 0.75) + (0.92 \times 0.3) = 0.336.$$

3) 
$$P(\text{face} | \text{black}) = \frac{P(\text{face and black})}{P(\text{black})}$$

$$= \frac{\left(\frac{12}{52} \times \frac{1}{2}\right)}{\left(\frac{1}{2}\right)} = 0.2308.$$

4) 
$$X \quad 0 \quad 1 \quad 2$$

$$P(x=X) \quad \frac{1}{4} \quad \frac{1}{2} \quad \frac{1}{4}$$

$$4b) E(X) = \left(0 \times \frac{1}{4}\right) + \left(1 \times \frac{1}{2}\right) + \left(2 \times \frac{1}{4}\right)$$

$$E(X) = 1$$

$$\text{Var}(X) = E(X^2) - E(X)^2$$

$$E(X^2) = \left(0^2 \times \frac{1}{4}\right) + \left(1^2 \times \frac{1}{2}\right) + \left(2^2 \times \frac{1}{4}\right)$$

$$= 1.5$$

$$\text{Var}(X) = 1.5 - 1^2 = 0.5$$

$$\text{SD}(X) = \sqrt{0.5} = 0.7071$$

$$5) E(5B+6) = 5E(B) + 6$$
$$= (5 \times 21) + 6$$
$$= 111$$

$$\text{Var}(5B+6) = 5^2 \text{Var}(B)$$
$$= 5^2 \times 5^2$$
$$= 625$$

$$\therefore \text{SD}(5B+6) = 25$$

$$b) E(2A-3B) = 2E(A) - 3E(B)$$
$$= (2 \times 53) - (3 \times 21)$$
$$= 43$$

$$\text{Var}(2A-3B) = 2^2 \text{Var}(A) + 3^2 \text{Var}(B)$$
$$= 4 \text{Var}(A) + 9 \text{Var}(B)$$
$$= (4 \times 36) + (9 \times 25)$$
$$= 369$$

$$\text{SD}(2A-3B) = \underline{\underline{19.2}}$$

$$6) X \sim B(18, 0.35)$$

$$P(X \geq 10)$$

$$= 1 - P(X < 10)$$

$$= 1 - P(X \leq 9) \quad (\text{as discrete})$$

$$= 1 - 0.9403 \quad (\text{from tables})$$

$$= \underline{\underline{0.0597}}$$

$$b) X \sim P_0(4) \quad P(X = 5)$$

By Tables

$$P(X = 5) = P(X \leq 5) - P(X \leq 4)$$

$$= 0.7851 - 0.6288$$

$$= 0.1563$$

$$7) X \sim U(0, 24)$$

$$E(X) = \frac{0 + 24}{2} = 12$$

$$\text{Var}(X) = \frac{(24 - 0)^2}{12} = 48.$$

$$8) X \sim B\left(300, \frac{450}{1000}\right)$$

$$X \sim B(300, 0.45)$$

as  $np$  and  $nq > 5$ .

$$X \sim N(135, 74.25)$$
  

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