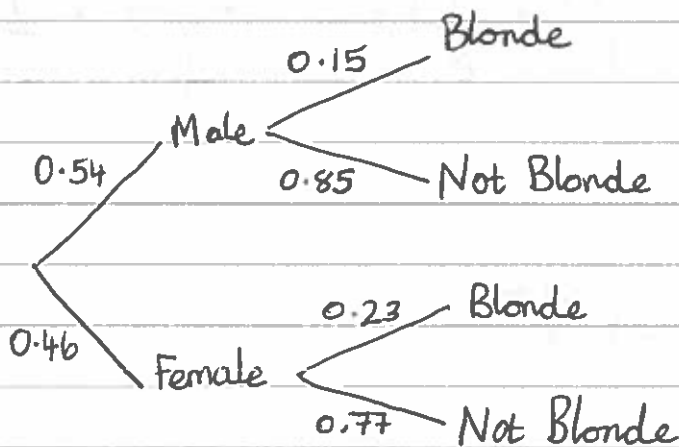


Unit Practice Test Answers 1.

- 1 a) i) Discrete
ii) Continuous
iii) Discrete

- b) • The generic battery on average lasted longer
• The brand named batteries times varied more than that of the generic battery.

2)



a) $0.46 \times 0.23 = 0.1058$

b) $(0.46 \times 0.23) + (0.54 \times 0.15) = 0.1868$

=

3) $P(\text{not a face} \mid \text{heart}) =$

$$\frac{P(\text{not a face and heart})}{P(\text{heart})} = \frac{\left(\frac{40}{52} \times \frac{1}{4}\right)}{\left(\frac{1}{4}\right)} = 0.7692$$

| | | | | | | |
|----|----------|---------------|---------------|---------------|---------------|---------------|
| 4) | X | 2 | 3 | 4 | 5 | 6 |
| | $p(x=X)$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{3}$ |

$$b) E(X) = \left(2 \times \frac{1}{6}\right) + \left(3 \times \frac{1}{6}\right) + \left(4 \times \frac{1}{6}\right) + \left(5 \times \frac{1}{6}\right) + \left(6 \times \frac{1}{3}\right) = 4.3$$

$$E(X^2) = \left(2^2 \times \frac{1}{6}\right) + \left(3^2 \times \frac{1}{6}\right) + \dots + \left(6^2 \times \frac{1}{3}\right)$$

$$E(X^2) = 21$$

$$\begin{aligned} \text{Var}(X) &= E(X^2) - E(X)^2 \\ &= \frac{20}{9} = 2.2 \end{aligned}$$

$$5) E(3Y - 5) = 3E(Y) - 5 = 30 - 5$$

$$\begin{aligned} \text{Var}(3Y - 5) &= 9\text{Var}(Y) \\ &= 225 \end{aligned}$$

$$b) E(Q) = E(S - T) = E(S) - E(T) = 5 - 9 = -4$$

$$\begin{aligned} \text{Var}(Q) &= \text{Var}(S - T) = \text{Var}(S) + \text{Var}(T) \\ &= 0.5^2 + 4^2 \\ &= 16.25 \end{aligned}$$

$$6) X \sim B(12, 0.2)$$

$$P(X=7)$$

$$\binom{12}{7} 0.2^7 0.8^5 = 0.0033$$

$$6) X \sim P_0(8)$$

$$P(X < 3) = P(X \leq 2)$$

$$\text{from tables} = 0.0138$$

$$7) X \sim U[13, 17]$$

$$a) E(X) = \frac{13+17}{2} = 15$$

$$\text{Var}(X) = \frac{(17-13)^2}{12} = \frac{4}{12} = \frac{1}{3}$$

