



H26-10min The General Addition Law: 10-minute Pack

EDEXCEL 1ST0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 Use the general addition law, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, to answer each part.

(a) Events A and B are such that $P(A) = 0.6$, $P(B) = 0.35$ and $P(A \text{ and } B) = 0.2$. Find $P(A \text{ or } B)$. (2)

(b) Events C and D are mutually exclusive, with $P(C) = 0.28$ and $P(D) = 0.55$. Find $P(C \text{ or } D)$. (2)

(Total for Question 1 is 4 marks)

2 A counter is drawn at random from a bag. Event R: the counter is red, with $P(R) = 0.35$. Event Y: the counter is yellow, with $P(Y) = 0.4$. A counter cannot be both red and yellow.

(a) Write down $P(R \text{ and } Y)$. (1)

(b) Find $P(R \text{ or } Y)$. (1)

(c) Explain why, for mutually exclusive events, the general addition law simplifies to $P(A \text{ or } B) = P(A) + P(B)$. (1)

(Total for Question 2 is 3 marks)

- 3** Two events A and B are such that $P(A \text{ or } B) = P(A) + P(B)$. Show that A and B must be mutually exclusive.

(Total for Question 3 is 3 marks)

Mark scheme · H26-10min The General Addition Law: 10-minute Pack

Question 1

- (a) **M1** $0.6 + 0.35 - 0.2$, oe
- (a) **A1** 0.75 cao
- (a) **Answer: 0.75**
- (b) **M1** $0.28 + 0.55$, oe ($P(C \text{ and } D) = 0$ since mutually exclusive)
- (b) **A1** 0.83 cao
- (b) **Answer: 0.83**

Question 2

- (a) **B1** 0 cao
- (a) **Answer: 0**
- (b) **B1** 0.75 cao ($0.35 + 0.4 - 0$)
- (b) **Answer: 0.75**
- (c) **B1** mutually exclusive events cannot both occur, so $P(A \text{ and } B) = 0$, and subtracting 0 from $P(A) + P(B)$ leaves $P(A) + P(B)$
- (c) **Answer: Because $P(A \text{ and } B) = 0$ for mutually exclusive events, so the term being subtracted disappears.**

Question 3

- **M1** equates the general addition law to the given statement: $P(A) + P(B) - P(A \text{ and } B) = P(A) + P(B)$, oe
- **A1** rearranges to $P(A \text{ and } B) = 0$
- **A1** correct conclusion: since $P(A \text{ and } B) = 0$, events A and B cannot both occur, so they are mutually exclusive
- **Answer: $P(A \text{ and } B) = 0$, so A and B are mutually exclusive.**