# Multi-step probability and tree diagrams: 10 practice questions

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Name: _____ Date: _____

Attempt all questions and show your working. Suggested time: 15 to 20 minutes.

## Section A: Consolidating (Questions 1-4)

### Question 1

Two fair coins are tossed.

(a) List all the possible outcomes.

(b) Find the probability of getting two heads.

(c) Find the probability of getting one head and one tail.

### Question 2

A spinner has three equal sections numbered 1, 2 and 3. It is spun twice and the two numbers are added.

(a) How many possible ordered pairs of spins are there?

(b) Find the probability that the sum is 4.

### Question 3

Events A and B are independent, with P(A) = 0.3 and P(B) = 0.5.

Find P(A and B).

### Question 4

Three fair coins are tossed.

(a) How many possible outcomes are there?

(b) Find the probability of getting three heads.

(c) Find the probability of getting exactly two heads.

## Section B: Standard (Questions 5-10)

### Question 5

Two fair six-sided dice are rolled. Find the probability that:

(a) the sum is 7

(b) both dice show the same number

(c) the product of the two numbers is odd.

**Question 6**

A bag contains 3 red counters and 2 green counters. A counter is taken out at random, its colour is noted, and it is put back. A second counter is then taken out at random.

Find the probability that:

(a) both counters are red

(b) one counter is red and one is green (in either order)

(c) at least one counter is green.

**Question 7**

A bag contains 3 red counters and 2 green counters. Two counters are taken out at random, one after the other, and the first counter is not put back.

(a) Draw a tree diagram showing all the outcomes and their probabilities.

(b) Find the probability that both counters are red.

(c) Find the probability that one counter is red and one is green (in either order).

(d) Find the probability that both counters are green.

**Question 8**

Events A and B are independent if $P(A \cap B) = P(A) \times P(B)$.

(a) $P(A) = 0.4$, $P(B) = 0.5$ and $P(A \cap B) = 0.2$. Are A and B independent?

(b) $P(C) = 0.3$, $P(D) = 0.6$ and $P(C \cap D) = 0.25$. Are C and D independent?

**Question 9**

On her way to school, Grace passes through three sets of traffic lights. Each set is green with probability 0.6 and red otherwise, independently of the others.

Find the probability that:

(a) all three lights are green

(b) none of the lights are green

(c) at least one light is green

(d) exactly two lights are green.

**Question 10**

A fair coin is tossed and a fair six-sided die is rolled.

(a) How many outcomes are in the sample space?

(b) Find the probability of a head and an even number.

(c) Find the probability of a tail or a 6 (or both).

# Multi-step probability and tree diagrams: answers

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**Question 1**

Answer: (a) HH, HT, TH, TT (b) ¼ (c) ½

**Question 2**

Answer: (a) 9 (b) ⅓ ((1,3), (2,2), (3,1))

**Question 3**

Answer: 0.15 (0.3 × 0.5)

**Question 4**

Answer: (a) 8 (b) ⅛ (c) ⅜ (HHT, HTH, THH)

**Question 5**

Answer: (a) ⅙ (6/36) (b) ⅙ (6/36) (c) ¼ (9/36, both odd)

**Question 6**

Answer: (a) 9/25 (b) 12/25 (2 × ⅗ × ⅖) (c) 16/25 (1 - 9/25)

**Question 7**

Answer: (a) First draw: R ⅗, G ⅖; after R: R 2/4, G 2/4; after G: R ¾, G ¼. (b) 3/10 (c) ⅗ (6/20 + 6/20) (d) 1/10

**Question 8**

Answer: (a) Yes, 0.4 × 0.5 = 0.2 (b) No, 0.3 × 0.6 = 0.18, which is not 0.25

**Question 9**

Answer: (a) 0.216 ($0.6^3$) (b) 0.064 ($0.4^3$) (c) 0.936 (1 - 0.064) (d) 0.432 ($3 \times 0.6^2 \times 0.4$)

**Question 10**

Answer: (a) 12 (b) ¼ (3/12) (c) 7/12 (6 tails, plus H6)