### Maths with Melissa

## **Probability Problem Solving Practice**

Show all working where possible and express your answers as fractions or decimals to two decimal places where appropriate.

#### **Essential Questions**

- 1. What is the difference between theoretical and experimental probability?
- 2. How can probability be used to make predictions in real-life situations?

### **Multiple Choice Questions**

- 1. A single card is drawn at random from a standard deck of 52 cards. What is the probability of drawing a heart?
- a)  $\frac{1}{2}$  b)  $\frac{1}{4}$  c)  $\frac{1}{13}$  d)  $\frac{1}{52}$
- 2. Two dice are rolled. What is the probability that the sum is 7?
- a)  $\frac{1}{12}$  b)  $\frac{1}{6}$  c)  $\frac{1}{9}$  d)  $\frac{1}{36}$

#### Fill in the Blank Questions

- 1. The probability of an event that is certain to happen is \_\_\_\_\_.
- 2. If a coin is flipped once, the probability of getting tails is \_\_\_\_\_.

## **True/False Questions**

- 1. True or False: The probability of any event is always between o and 1.
- 2. True or False: If two events are mutually exclusive, they can both happen at the same time.

## **Short Answer Questions**

- 1. A bag contains 3 red balls and 5 blue balls. If a ball is picked at random, what is the probability it is blue?
- 2. In a class of 20 students, 12 are girls and 8 are boys. If one student is selected at random, what is the probability that the student is a boy?

## **Essay Question**

1. A box contains 6 green, 4 yellow, and 5 orange sweets. If two sweets are drawn at random without replacement, what is the probability that both are green? Show all working and explain your reasoning.

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# **Answer Key**

## **Essential Questions:**

- 1. Theoretical probability is based on the possible outcomes in a perfect world, while experimental probability is based on actual results from experiments.
- 2. Probability helps to estimate the likelihood of future events, such as weather forecasts or risk assessments in business.

## **Multiple Choice Answers:**

- 1. b)  $\frac{1}{4}$
- 2. b)  $\frac{1}{6}$

#### Fill in the Blank Answers:

- 1. 1
- 2.  $\frac{1}{2}$  or 0.5

#### **True/False Answers:**

- 1. True
- 2. False If two events are mutually exclusive, they cannot both happen at the same time.

### **Short Answer Answers:**

- 1. Probability of blue:  $\frac{5}{8}$
- 2. Probability of boy:  $\frac{8}{20} = \frac{2}{5}$

# **Essay Question Sample Answer:**

- Total number of sweets = 6 + 4 + 5 = 15
- Probability first sweet is green:  $\frac{6}{15}$
- Probability second sweet is green (after one green is taken):  $\frac{5}{14}$
- Probability both are green:  $\frac{6}{15} \times \frac{5}{14} = \frac{30}{210} = \frac{1}{7}$
- Therefore, the probability that both sweets are green is  $\frac{1}{7}$ .