WORKSHEET # 008 | Australian Curriculum Year 7 Mathematics | WM7T4U8

ACACIA TUTORING

Probability 7

Free and always will be!

Focus: A set of questions and solutions for Year 7 students focused on 'Probability' under the "Probability" strand, tailored to the Australian Curriculum:

1. Understanding Probability:

a) Define probability. Explain why the probability of an event must be between 0 and 1.

Solution:
Probability is the measure of the likelihood that an event will occur, expressed as a number between 0 and 1. A probability of 0 means the event is impossible, while 1 means the event is certain. Any value between these represents the degree of likelihood, with fractions or decimals showing the chance of the event happening.

b) What does it mean for an event to have a probability of 0.5 ?

Solution:
An event with a probability of 0.5has an equal chance of occurring or not occurring ($50\,\%$ chance).

2. Basic Probability Calculation:

a) If you flip a fair coin, what is the probability of getting heads?

Solution:

There are 2 outcomes (heads or tails), so the probability of getting heads is $\frac{1}{2}$.

b) A spinner has 4 equal sections coloured red, blue, green, and yellow. What is the probability of landing on green?

Solution:

With 4 sections, the probability of landing on green is $\frac{1}{4}$.

3. Complementary Events:

If the probability of it raining tomorrow is 0.3 , what is the probability that it will not rain?

Solution:
The probability of the complementary event (not raining) is:
$1 - 0.3 = 0.7$.

4. Probability of Multiple Events:

a) If you roll a die, what is the probability of getting an even number?

Solution:
There are 3 even numbers $(2,\ 4,\ 6)$ out of 6 possible outcomes, so the probability is

$$\frac{3}{6} = \frac{1}{2}.$$

b) What is the probability of drawing a heart from a standard deck of cards?

Solution:
There are 13 hearts out of 52 cards, so the probability is $\frac{13}{52} = \frac{1}{4}$.

5. Experimental vs. Theoretical Probability:

a) Explain the difference between experimental and theoretical probability.

Solution:
Theoretical Probability is calculated based on what should happen under ideal conditions (e.g., the probability of flipping a coin).
Experimental Probability is determined by actually performing an experiment and observing outcomes (e.g., flipping a coin 100 times and recording how often heads come up).

b) If you rolled a die 60 times and got a 6 fifteen times, what would be the experimental probability of rolling a 6 ?

Solution:

$$\text{Experimental probability} = \frac{\text{Number of times 6 was rolled}}{\text{Total number of rolls}}$$
$$= \frac{15}{60}$$
$$= \frac{1}{4}.$$

6. Practical Application:

A bag contains 3 red, 2 blue, and 5 green marbles. If one marble is drawn at random, what is the probability of drawing a blue marble?

Solution:
Total marbles:
$$= 3 + 2 + 5$$
$$= 10.$$

Probability of blue:
$$= \frac{2}{10}$$
$$= \frac{1}{5}.$$

7. Independent Events:

If you roll a die twice, what is the probability of getting a 4 on the first roll and a 3 on the second roll?

Solution:
Since the events are independent, you multiply the probabilities:

$$\frac{1}{6} \times \frac{1}{6}$$
$$= \frac{1 \times 1}{6 \times 6}$$
$$= \frac{1}{36}.$$

8. Mutually Exclusive Events:

Are getting heads or tails on a coin flip mutually exclusive events? Why or why not?

Solution:
Yes, they are mutually exclusive because they cannot happen at the same time; if one occurs, the other does not.

Additional Notes for Teachers:

Learning Outcomes: Students should understand the concept of probability, calculate simple probabilities, and differentiate between theoretical and experimental probabilities.

Teaching Strategies: Use everyday examples like weather forecasts, game outcomes, or lotteries to illustrate probability. Incorporate activities where students can perform experiments to observe probability in action. Encourage discussion on how probabilities can change based on new information or conditions.

Assessment: Evaluate through practical problems, simulations, and tasks where students calculate probabilities or predict outcomes based on given scenarios.

Resources: Dice, coins, spinners, or digital tools for simulations can be useful for interactive learning.

This question set aligns with the Australian Curriculum for Year 7, focusing on the proficiencies of understanding, fluency, problem-solving, and reasoning in statistics and probability.