

Probability

Homework · Chance, outcomes and events · Grade 9

Name: _____

Date: _____

Score: / 13

INSTRUCTIONS

- Complete the hands-on task first, then work through the three tiers.
- Show your working in the space given. Write fractions in simplest form unless told otherwise.
- Tier markers: ● Foundation ■ Growing ▲ Challenge.



Hands-on task

Run your own experiment · Question T1

T1

Roll a die (or use a dice app) **30 times**. Record each result in the tally table, then fill in the frequencies and the total.

Number rolled	1	2	3	4	5	6	Total
Tally							
Frequency							

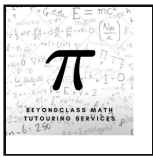
Record your own results here

(a) Use your results to find the **experimental probability** of rolling a 6. Write it as a fraction.

(b) Write the **theoretical probability** of rolling a 6.

(c) How many sixes would you **expect** in 30 rolls?

(d) Compare your answers to (a) and (b). Would your experimental probability get closer to the theoretical one with 300 rolls? Explain why.



Foundation

Build the language and the basic formula · Questions F1 – F4

F1

A letter is chosen at random from the word **PROBABILITY**.

(a) Write down $n(S)$.

(b) Find $P(B)$.

(c) Find $P(\text{a vowel})$.

(d) Find $P(Z)$.

F2

Answer these using the probability scale (0 to 1).

(a) Write the probability of an **impossible** event and of a **certain** event.

(b) The probability that a bus arrives on time is 0.82. Find the probability that it is **not** on time.

(c) Write $\frac{3}{4}$ as a decimal and as a percentage.

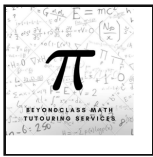
F3

A fair coin is tossed and a spinner with sections 1, 2, 3 is spun. Complete the sample space diagram.

	Spinner: 1	Spinner: 2	Spinner: 3
Coin: H			
Coin: T			

(a) Find $P(\text{tails and } 3)$.

(b) Find $P(\text{heads and an odd number})$.



F4

Use expected number = $P(E) \times \text{number of trials}$.

(a) The probability that an item is faulty is 0.15. In a batch of 600 items, how many do you expect to be faulty?

(b) In a survey, 7 out of 40 students chose cricket as their favourite sport. Find the experimental probability that a student chose cricket.



Growing

Use diagrams and the AND / OR rules · Questions G1 – G5

G1

Two fair dice are rolled and the scores are **multiplied**. Complete the grid.

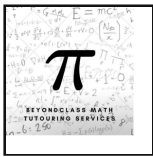
×	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

Row = first die, column = second die

(a) Find $P(\text{product} = 12)$.

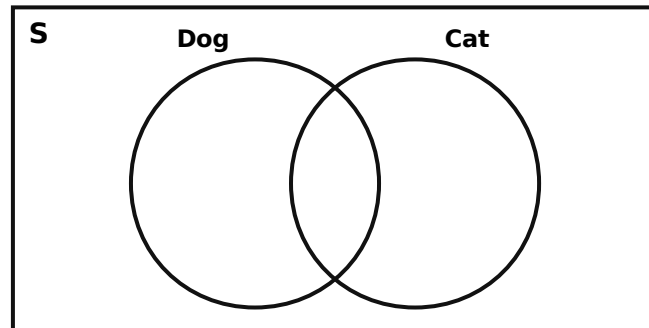
(b) Find $P(\text{product is odd})$.

(c) Find $P(\text{product is greater than 20})$.



G2

In a group of 30 students, 17 have a dog, 11 have a cat and 4 have both. Complete the Venn diagram, then find each probability for a student chosen at random.



Write the number of students in each region

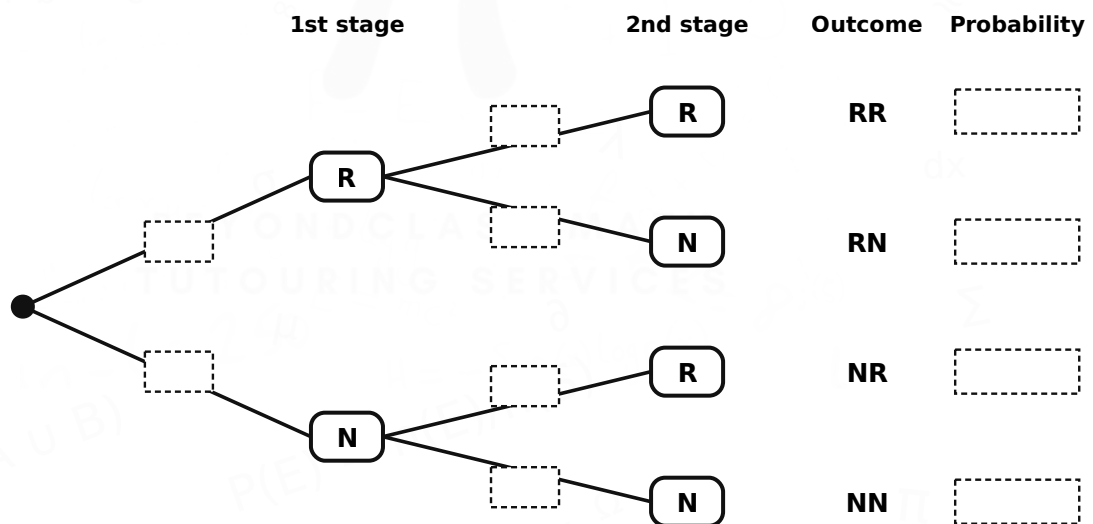
(a) $P(\text{dog only})$

(b) $P(\text{dog or cat})$

(c) $P(\text{neither})$

G3

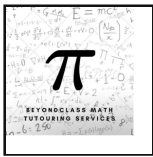
The probability of rain is 0.3 on Monday and 0.3 on Tuesday. The two days are independent. Complete the tree diagram (R = rain, N = no rain).



(a) Find $P(\text{rain on both days})$.

(b) Find $P(\text{rain on exactly one day})$.

(c) Find $P(\text{no rain on either day})$.



G4

A box holds 5 mint sweets and 3 toffee sweets. Two sweets are taken at random **without replacement**. Draw a tree diagram in the space below, then find:

(a) $P(\text{both are mint})$

(b) $P(\text{two different flavours})$

Working space

G5

Complete the totals in the two-way table. A member is chosen at random.

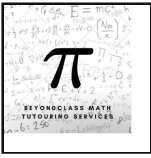
	Tennis	Swimming	Total
Juniors	18	22	
Seniors	30	20	
Total			

Favourite sport of 90 club members

(a) Find $P(\text{swimming})$.

(b) Find $P(\text{a senior who chose tennis})$.

(c) Find $P(\text{tennis, given that the member is a senior})$.



Challenge

Reason, justify and combine ideas · Questions C1 – C3

C1

A bag has 3 white marbles and some black marbles. $P(\text{white}) = \frac{3}{8}$.

(a) How many black marbles are in the bag?

(b) Two more black marbles are added. Find the new probability of choosing a white marble.

C2

The probability that Ada passes Test A is 0.7. The probability that she passes Test B is 0.6. The tests are independent.

(a) Find $P(\text{Ada passes both tests})$.

(b) Find $P(\text{Ada passes at least one test})$.

(c) Find $P(\text{Ada passes exactly one test})$.

C3

Five cards are numbered 1, 2, 3, 4, 5. Two cards are chosen one after the other **without replacement**.

(a) Find $P(\text{both cards are odd})$.

(b) Find $P(\text{the sum of the two cards is 5 or more})$. (Hint: think about the complement.)

(c) Ben says that the probability of getting two aces from a standard deck is $\frac{4}{52} \times \frac{4}{52}$. Explain his mistake.