

Date: \_\_\_\_\_

**KEY**

### 11.1 Determining Probabilities Using Tree Diagrams

Probability is the likelihood or chance of an event occurring

**Some definitions for you to know:**

Sample Space: *all possible outcomes of a probability experiment.*

Independent Events: *results for which the outcome of one event has no effect on the outcome of another event.*

Outcomes: *subsets of the sample space,*

Can you express probability as a formula?

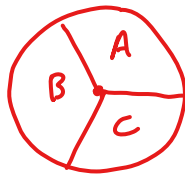
$$\text{Probability} = \frac{\text{number of favourable outcomes}}{\text{total possible outcomes}}$$

We can often determine probabilities from a tree diagram.

A spinner is divided into three equal regions called A, B, C. The spinner is spun twice.

a.) What is the probability of spinning an A on the first spin?

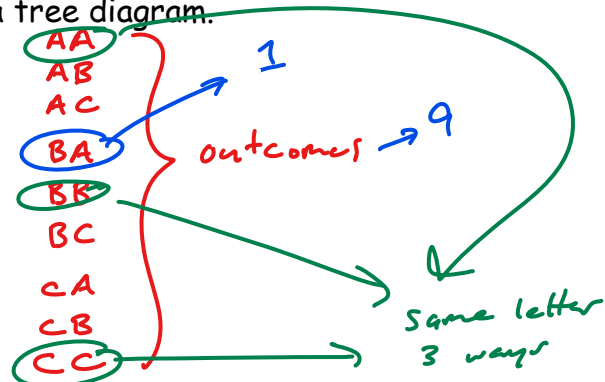
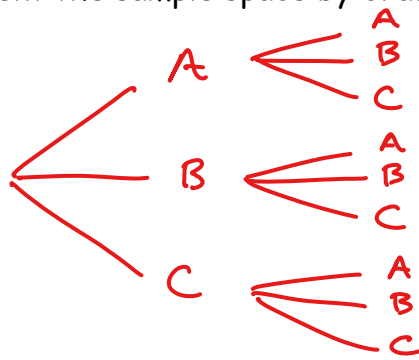
# of favourable outcomes = 1



total outcomes = 3

Fraction	Decimal	Percent
$\frac{1}{3}$	0.33	33%

b) We can represent the sample space by drawing a tree diagram.



c) What do you think the probability of spinning an A followed by a B

$$P = \frac{\text{favourable}}{\text{total}} \quad \left| \quad \boxed{P = \frac{1}{9}}$$

We can use probability format to represent this question.  
 $P(AB) = \frac{1}{9}$

d) What is the probability of getting the same letter on both spins

How can you represent in probability format

$$P = \frac{\text{favourable}}{\text{total}} \quad \left| \quad \begin{array}{l} \boxed{P = \frac{3}{9}} \\ \boxed{P = \frac{1}{3}} \end{array}$$

## Determining Probabilities from a Table

Slick Rick McChip loves playing games with dice. He rolls two standard six-sided die. One die is black and one die is red. He always rolls two at a time. We can use a table to create a sample space for this situation.

	1	2	3	4	5	6
1	1,1	1,2	1,3	1,4	1,5	1,6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1	3,2	3,3	3,4	3,5	3,6
4	4,1	4,2	4,3	4,4	4,5	4,6
5	5,1	5,2	5,3	5,4	5,5	5,6
6	6,1	6,2	6,3	6,4	6,5	6,6

3 outcomes greater than 10.

5 outcomes where red is 1 larger than black.

6 outcomes are doubles

a) What is the probability of rolling doubles?

$$P(\text{doubles}) = \frac{\text{favorable}}{\text{total}}$$

Ⓢ How many outcomes are doubles? COUNT

$$P(\text{doubles}) = \frac{1}{6}$$

Ⓢ Look at table. There are 36 total outcomes.

$$P(\text{doubles}) = \frac{6}{36}$$

b) What is the probability of rolling more than ten when we add the two outcomes together?

$$P(\text{more than 10}) = \frac{3}{36}$$

$$P(\text{more than 10}) = \frac{1}{12}$$

Represent this situation in probability format

$$P(>10) =$$

c) What is the probability that the number on the red die is <sup>exactly</sup> one larger than the number on the black die?

$$P(\text{red} = \text{black} + 1) = \frac{5}{36}$$

d) What is the probability that the sum of the two numbers is less than 11?

$$P(<11) = \frac{33}{36}$$

$$P(<11) = \frac{11}{12}$$

Represent this situation in probability format

$$P(<11) = \frac{11}{12}$$