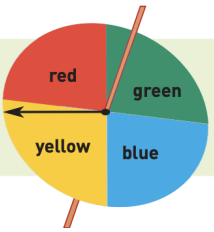
Walt understand sample space and write a statement for probability
Success Criteria I know how to write information about sample space. I can write the probability for the outcome.

EXAMPLE 1

A spinner is divided into 4 equal portions coloured red, blue, green and yellow. If the spinner is spun, find the probability that it lands on:

a red **b** green **c** blue or yellow



Sample space, S = {R, B, G, Y} Number of possible outcomes, $n(S) = 4$

a Favourable outcomes = {R} Number of favourable outcomes = 1
$P(R) = \frac{1}{4}$

b Favourable outcomes = {G} Number of favourable outcomes = 1
$P(R) = \frac{1}{4}$

c Favourable outcomes = {B, Y} Number of favourable outcomes = 2
$P(B \text{ or } Y) = \frac{2}{4} = \frac{1}{2}$

Exercise 12A

1 A bag contains 1 red (R), 1 blue (B), 1 green (G), 1 yellow (Y) and 1 white (W) marble. One marble is chosen at random from the bag. Complete to find the following probabilities.

S = {_____} Number of possible equally likely outcomes = _____

a Probability that the marble is red:
Favourable outcomes = {_____} Number of favourable outcomes = _____
$P(R)$ = _____

b Probability that the marble is green:
Favourable outcomes = {_____} Number of favourable outcomes = _____
$P(G)$ = _____

c Probability that the marble is red or green:
Favourable outcomes = {_____} Number of favourable outcomes = _____
$P(R \text{ or } G)$ = _____

d Probability that the marble is blue or white:
Favourable outcomes = {_____} Number of favourable outcomes = _____
$P(B \text{ or } W)$ = _____

e Probability that the marble is blue or yellow or white:
Favourable outcomes = {_____} Number of favourable outcomes = _____
$P(B \text{ or } Y \text{ or } W)$ = _____

2 A normal six-sided die is rolled. Find the probability of getting:

a 6 **b** 3 **c** 3 or 6

d an even number **e** an odd number **f** a number > 3

3 The numbers 0, 1, 2, 3, … 9 are written on 10 cards. The cards are shuffled and one is selected at random. Find the probability that it shows:

a 3 **b** 9 **c** 3 or 9

d an even number **e** an odd number **f** a number > 6

g a multiple of 4

4 The numbers 1, 2, 3, …7 are written on cards. The cards are shuffled and one is selected at random. Find the probability that it is:

a 4 **b** 5 **c** 4 or 5

d an even number **e** an odd number **f** a number > 4

5 The letters of the alphabet are written on cards. The cards are shuffled and one is selected at random. Find the probability that the letter shown is:

a K **b** Z **c** K or Z

d a vowel **e** a consonant **f** a letter of the word RANDOM

EXAMPLE 2

A hat contains 3 red, 4 blue and 5 green tickets. If one ticket is chosen at random, what is the probability that it is:

a red? **b** blue? **c** red or blue? **d** green? **e** blue or green?

S = {R, R, R, B, B, B, B, G, G, G, G, G}

Number of possible equally likely outcomes = 12

a Favourable outcomes = {R, R, R} Number of favourable outcomes = 3

$P(\text{R}) = \frac{3}{12} = \frac{1}{4}$

b Favourable outcomes = {B, B, B, B} Number of favourable outcomes = 4

$P(\text{B}) = \frac{4}{12} = \frac{1}{3}$

c Favourable outcomes = {R, R, R, B, B, B, B} Number of favourable outcomes = 7

$P(\text{R or B}) = \frac{7}{12}$

d Favourable outcomes = {G, G, G, G, G} Number of favourable outcomes = 5

$P(\text{G}) = \frac{5}{12}$

e Favourable outcomes = {B, B, B, B, G, G, G, G, G} Number of favourable outcomes = 9

$P(\text{B or G}) = \frac{9}{12} = \frac{3}{4}$

6 A bag contains 5 blue and 2 red marbles. One marble is drawn at random. Complete to find the following probabilities.

S = {_____}

Number of possible equally likely outcomes = ___

a Probability that the marble is blue:

Favourable outcomes = {_____}

Number of favourable outcomes = ___

$P(\text{B}) =$ ___

b Probability that the marble is red:
Favourable outcomes = {_____} Number of favourable outcomes = ___
$P(\text{R}) =$ ___

c Probability that the marble is blue or red:
Favourable outcomes = {_____} Number of favourable outcomes = ___
$P(\text{B or R}) =$ ___

7 A purse contains two 5-cent coins, three 10-cent coins, four 20-coins and one 50-cent coin. A coin is chosen at random from this purse. Find the probability that the value of the coin is:

a 10 cents **b** 20 cents **c** 10 cents or 20 cents
d 5 cents **e** 5 cents or 10 cents **f** more than 10 cents.

8 One hundred tickets are sold in a raffle. What is the probability of winning the raffle if you buy:

a 1 ticket? **b** 2 tickets? **c** 5 tickets? **d** 10 tickets?

9 A card is selected at random from a normal playing pack of 52 cards. Find the probability that it is:

a the king of clubs **b** a king **c** a spade
d black **e** a red 7 **f** a jack or a queen.

10 A letter is chosen at random from the letters of the word HIPPOPOTAMUS. What is the probability that the letter chosen is:

a H? **b** O? **c** P?

11 A set of traffic lights shows green for 45 seconds, amber for 5 seconds and red for 30 seconds. When approaching this set of lights, what is the probability that it will be showing:

a green?
b amber?
c red?

12 **a** A normal six-sided die is rolled. Find the probability of getting a:

i 7 **ii** 9

b What kind of events are those in part **a**?

c Find the probability of getting:

1 $S = \{R, B, G, Y, W\}$

Number of possible outcomes $= 5$

a Favourable outcomes $= \{R\}$

Number of favourable outcomes $= 1$

$P(R) = \frac{1}{5}$

b Favourable outcomes $= \{G\}$

Number of favourable outcomes $= 1$

$P(G) = \frac{1}{5}$

c Favourable outcomes $= \{R, G\}$

Number of favourable outcomes $= 2$

$P(R \text{ or } G) = \frac{2}{5}$

d Favourable outcomes = {B, W}
Number of favourable outcomes = 2
P(B or W) = $\frac{2}{5}$

e Favourable outcomes = {B, Y, W}
Number of favourable outcomes = 3
P(B or Y or W) = $\frac{3}{5}$

2 **a** $\frac{1}{6}$ **b** $\frac{1}{6}$ **c** $\frac{1}{3}$ **d** $\frac{1}{2}$
e $\frac{1}{2}$ **f** $\frac{1}{2}$

3 **a** $\frac{1}{10}$ **b** $\frac{1}{10}$ **c** $\frac{1}{5}$ **d** $\frac{2}{5}$
e $\frac{1}{2}$ **f** $\frac{3}{10}$ **g** $\frac{1}{5}$

4 **a** $\frac{1}{7}$ **b** $\frac{1}{7}$ **c** $\frac{2}{7}$ **d** $\frac{3}{7}$
e $\frac{4}{7}$ **f** $\frac{3}{7}$

5 **a** $\frac{1}{26}$ **b** $\frac{1}{26}$ **c** $\frac{1}{13}$ **d** $\frac{5}{26}$
e $\frac{21}{26}$ **f** $\frac{3}{13}$

6 S = {B, B, B, B, B, R, R}
Number of possible equally likely outcomes = 7

a Favourable outcomes = {B, B, B, B, B},
Number of favourable outcomes = 5
P(B) = $\frac{5}{7}$

b Favourable outcomes = {R, R}
Number of favourable outcomes = 2
P(R) = $\frac{2}{7}$

c Favourable outcomes = {B, B, B, B, B, R, R}
Number of favourable outcomes = 7
P(B or R) = 1

7 **a** $\frac{3}{10}$ **b** $\frac{2}{5}$ **c** $\frac{7}{10}$ **d** $\frac{1}{5}$
e $\frac{1}{2}$ **f** $\frac{1}{2}$

8 **a** $\frac{1}{100}$ **b** $\frac{1}{50}$ **c** $\frac{1}{20}$ **d** $\frac{1}{10}$

9 **a** $\frac{1}{52}$ **b** $\frac{1}{13}$ **c** $\frac{1}{4}$ **d** $\frac{1}{2}$
e $\frac{1}{26}$ **f** $\frac{2}{13}$