

# Notes

S 12

## Probability Review

1. Determine the probability of the following:

a) Rolling a 4 on a single die.

$$P(4) = \frac{1}{6} \approx 16.67\%$$

b) Rolling a sum of 6 on a pair of dice.

$$1+5$$

$$5+1$$

$$2+4$$

$$4+2$$

$$3+3$$

$$P(\text{sum of } 6) = \frac{5}{36} \approx 13.89\%$$

c) Flipping tails with a coin.

$$P(T) = \frac{1}{2} = 50\%$$

d) Flipping two heads with two coins.

$$P(HH) = \frac{1}{4} = 25\%$$

e) Selecting a blue ball from a bag containing a red, a blue, a green, a yellow, a brown and a purple ball.

$$n(S) = 6$$

$$P(\text{blue}) = \frac{1}{6} \approx 16.67\%$$

2. State whether the events are dependent or independent. Justify your reasoning.

a) Flipping a coin and rolling a die.

I

b) Dealing a card to one person and a second card to another person.

1

$$\frac{1}{52} = 1.92\% \quad \frac{1}{51} = 1.96\%$$

c) Rolling two dice.

I

d) Randomly selecting a date from a calendar. Randomly selecting someone's name from a list.

I, I

3. An icosahedron die has 20 faces labelled from 1 to 20. When rolled, what is the probability that the upper face is:

a) 3?  $P(3) = \frac{1}{20} = 5\%$

b) 4?  $P(4) = \frac{1}{20} =$

c) 3 or 4?

$\pi$   $P(3 \cup 4) = P(3) + P(4) = \frac{2}{20} = \frac{1}{10}$

mutually exclusive

$$= 10\%$$

d) even?

$$n(\text{even}) = 10$$

$$n(S) = 20$$

$$P(\text{even}) = \frac{10}{20} = \frac{1}{2} = \underline{50\%}$$

e) a prime number?

$$\text{prime} = 2, 3, 5, 7, 11, 13, 17, 19$$

$$n(\text{prime}) = 8$$

$$n(S) = 20$$

$$P(\text{prime}) = \frac{8}{20} = \frac{2}{5} = \underline{40\%}$$

f) greater than six?  $\rightarrow 7-20$

$$n(x > 6) = 14$$

$$P(x > 6) = \frac{14}{20} = \frac{7}{10} = \underline{70\%}$$

4. A coin is flipped five times. How many results are possible in which there are

a) No consecutive flips of heads or tails?

$$n(S) = 2^5 = 32$$

H T H T H

OR

T H T H T

$$\underline{\underline{n = 2}}$$

✓  
0

b) at least two consecutive flips of tails?

$$\boxed{T \quad T} \quad \underline{2 \times 2 \times 2} = 2^3 = 8$$

$$\underline{H} \quad \boxed{T \quad T} \quad \underline{2 \times 2} = 2^2 = 4$$

$$\underline{2} \quad \underline{H} \quad \boxed{T \quad T} \quad \underline{2} = 2^2 = 4$$

$$\begin{array}{l} \left\langle \begin{array}{l} \underline{T} \quad \underline{H} \quad \underline{H} \quad \boxed{T \quad T} = 1 \\ \underline{H} \quad \underline{2} \quad \underline{H} \quad \boxed{T \quad T} = 2 \end{array} \right. \quad \underline{n = 19} \end{array}$$

c) two flips of two consecutive tails?

$\Rightarrow$

4 or 5 in a row  
is ok



$$\underline{n = 4}$$