

## Your Turn

1. A fair dice and a fair coin are thrown. Complete the sample space diagram showing all possible outcomes.

|      |   | Dice        |             |             |             |             |             |
|------|---|-------------|-------------|-------------|-------------|-------------|-------------|
|      |   | 1           | 2           | 3           | 4           | 5           | 6           |
| Coin | H | 1, H        | <b>2, H</b> | <b>3, H</b> | <b>4, H</b> | <b>5, H</b> | <b>6, H</b> |
|      | T | <b>1, T</b> | <b>2, T</b> | <b>3, T</b> | <b>4, T</b> | <b>5, T</b> | <b>6, T</b> |

2. Two fair dice are thrown and the scores are added together.

|        |   | Dice 1   |          |          |           |           |           |
|--------|---|----------|----------|----------|-----------|-----------|-----------|
|        |   | 1        | 2        | 3        | 4         | 5         | 6         |
| Dice 2 | 1 | 2        | <b>3</b> | <b>4</b> | <b>5</b>  | <b>6</b>  | <b>7</b>  |
|        | 2 | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b>  | <b>7</b>  | <b>8</b>  |
|        | 3 | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b>  | <b>8</b>  | <b>9</b>  |
|        | 4 | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b>  | <b>9</b>  | <b>10</b> |
|        | 5 | <b>6</b> | <b>7</b> | <b>8</b> | <b>9</b>  | <b>10</b> | <b>11</b> |
|        | 6 | <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> | <b>11</b> | <b>12</b> |

- a. Complete the sample space diagram showing all possible outcomes.

- b. How many outcomes are there altogether?

**36**

- c. What is the highest possible score?

**12**

- d. Work out the probability of rolling a 3, giving your answer as a fraction in its simplest form.

$$\frac{2}{36} = \frac{1}{18}$$

- e. Find the probability of rolling a number greater than 9, giving your answer as a fraction in its simplest form.

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

3. Two fair dice are thrown and the difference between the scores is recorded.

|        |   | Dice 1   |          |          |          |          |          |
|--------|---|----------|----------|----------|----------|----------|----------|
|        |   | 1        | 2        | 3        | 4        | 5        | 6        |
| Dice 2 | 1 | 0        | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> |
|        | 2 | <b>1</b> | <b>0</b> | 1        | <b>2</b> | <b>3</b> | <b>4</b> |
|        | 3 | <b>2</b> | <b>1</b> | <b>0</b> | <b>1</b> | <b>2</b> | <b>3</b> |
|        | 4 | <b>3</b> | <b>2</b> | <b>1</b> | <b>0</b> | <b>1</b> | <b>2</b> |
|        | 5 | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b> | <b>0</b> | <b>1</b> |
|        | 6 | <b>5</b> | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b> | <b>0</b> |

- a. Complete the sample space diagram, showing all possible outcomes.

Hint: subtract the smaller number from the larger.

- b. What is the probability that the difference between the scores is 5?

$$\frac{2}{36} = \frac{1}{18}$$

- c. What is the probability that the difference between the scores is 7?

**0**

4. Two fair dice are thrown and the product of the two scores is found.

|        |   | Dice 1   |           |           |           |           |           |
|--------|---|----------|-----------|-----------|-----------|-----------|-----------|
|        |   | 1        | 2         | 3         | 4         | 5         | 6         |
| Dice 2 | 1 | <b>1</b> | <b>2</b>  | <b>3</b>  | <b>4</b>  | <b>5</b>  | <b>6</b>  |
|        | 2 | <b>2</b> | <b>4</b>  | <b>6</b>  | <b>8</b>  | <b>10</b> | <b>12</b> |
|        | 3 | <b>3</b> | <b>6</b>  | <b>9</b>  | <b>12</b> | <b>15</b> | <b>18</b> |
|        | 4 | <b>4</b> | <b>8</b>  | <b>12</b> | <b>16</b> | <b>20</b> | <b>24</b> |
|        | 5 | <b>5</b> | <b>10</b> | <b>15</b> | <b>20</b> | <b>25</b> | <b>30</b> |
|        | 6 | <b>6</b> | <b>12</b> | <b>18</b> | <b>24</b> | <b>30</b> | <b>36</b> |

- a. Complete the sample space diagram, showing all possible outcomes.

Hint: product means multiply.

- b. What is the probability the product is 1?

$$\frac{1}{36}$$

- c. What is the probability the product is an odd number? Give your answer as a fraction in its simplest form.

$$\frac{9}{36} = \frac{1}{4}$$

- d. Find the probability the product is greater than 24, giving your answer as a fraction in its simplest form.

$$\frac{4}{36} = \frac{1}{9}$$

### Challenge:

A fair, 4-sided spinner contains the numbers 1, 2, 3 and 4. A second fair spinner has 3 sides and contains the numbers 3, 7 and 11. The spinners are spun and their scores are added together. Find the probability that the total score is a prime number.

|                 |    | 4-sided spinner |    |    |    |
|-----------------|----|-----------------|----|----|----|
|                 |    | 1               | 2  | 3  | 4  |
| 3-sided spinner | 3  | 4               | 5  | 6  | 7  |
|                 | 7  | 8               | 9  | 10 | 11 |
|                 | 11 | 12              | 13 | 14 | 15 |

The prime numbers in this table are 5, 7, 11 and 13.

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