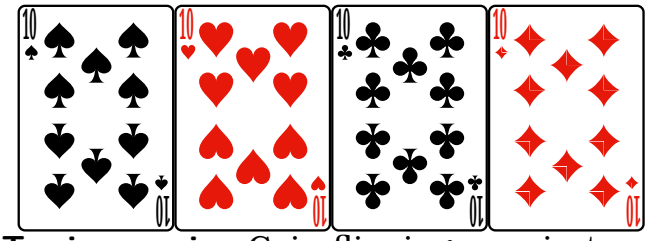
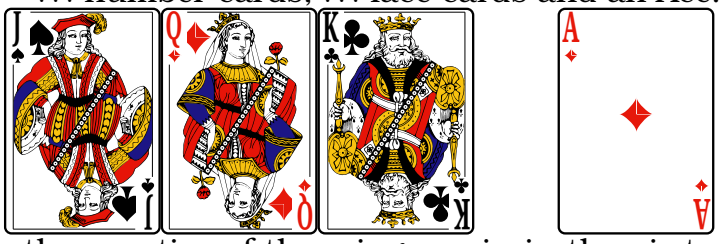
3.1 Lesson 1 Basic vocabulary

Playing cards A complete set of cards is called a **pack** or **deck**

There are .....cards in total. There are 4 suits: ♠.....♡.....♣.....♢.....

There 13 cards in each suit: ... number cards, ... face cards and an Ace.





Tossing a coin Coin flipping or coin tossing is the practice of throwing a coin in the air to choose between two possible **outcomes** when a coin is tossed, there are 2 possible outcomes:

Head

Tail

Idiom of the day

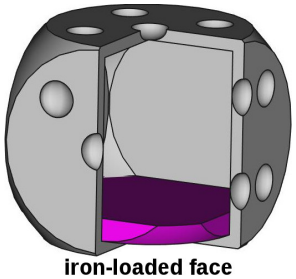
If you can't make head or tail of something, you can't understand it at all.

Example: "Today's math course was so confusing. I couldn't make head or tail of it!"

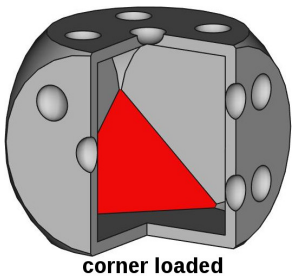
Rolling a die (plural : dice) A **fair** die is one that has an equal chance of landing on any one of its faces. The mathematical term for such solid shapes is **Isohedra** (*isoédrique*).

A Usual d6 fair die is a cube with 6 sides. When rolled, a d6 die has .....possible outcomes.

Skewed dice have non isohedral shapes, they can still be fair. Weighted dice are used to change the odds.



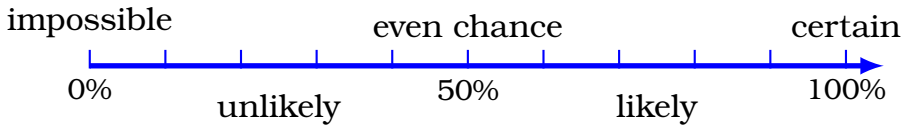
iron-loaded face



corner loaded

Picking a counter, a token, a chip out of a bag .....

In the field of **probability theory** we use mathematics to describe the **chance** or **likelihood** of an event happening. We assign to every **event** a number which lies between 0 and 1 inclusive. We call this number a **probability**. The probability scale describes the chance of some event happening :



The (theoretical) probability of an event A is $P(A) = \dfrac{\text{number of successful outcomes}}{\text{total number of equally likely outcomes}}$

Exercise 1

6	7	8	8

1. One of the number cards is to be chose at random.

   Chose the correct word to describe the probability of each outcome.

   a) The number 8 will be chosen. .....

   b) The number 6 will be chosen. .....

   c) The number 5 will be chosen. .....

   d) A number greater than 5 will be chosen. .....

   e) An even number will be chosen. .....

2. Which of the following are probabilities for **even chance** outcomes? 50% 0.05 $\frac{1}{2}$ 20% 0.5 $\frac{3}{6}$

3. Which of the following are probabilities for **likely** outcomes? $\frac{4}{9}$ 0.7 100% 60% 0.45 $\frac{2}{3}$

4. A normal, fair, six-sided die is rolled. Which of these events are impossible?

   Circle all that apply.

   a) It lands on a number less than 1

   b) It lands on a prime number

   c) It lands on a multiple of 9

   d) It lands on a square number.

5. True or false?

   a) An impossible event has a probability of -1 .....

   b) Probabilities can be described using fractions, decimals or percentages. .....

   c) The probability of a certain event is 100. .....

6. An ordinary six-sided die is rolled. Work out the probability that the die lands on :

   a) the number 6. $P(A) =$ .....

   b) a prime number. $P(B) =$ .....

   c) a cube number. $P(C) =$ .....

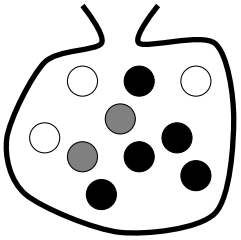
   d) a multiple of 3. $P(D) =$ .....

   e) a number that is not 4. $P(E) =$ .....

   f) a factor of 36. $P(F) =$ .....

g) a number greater than 2. $P(G) = \ldots\ldots$ | h) a number that is less than 4. $P(H) = \ldots$

7. A bag contains black, white and gray (US)/grey(UK) tokens as shown. A token is picked from the bag. Complete the statements.

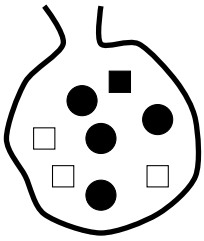


   a) The probability that the token is ..... is 0.3
   b) The probability that the token is white or ..... is 50%
   c) The probability that the token is black, white or grey is .....

8. A bag contains only pink and blue counters, in the ratio $3:4$. What is the probability of picking a pink counter from the bag?

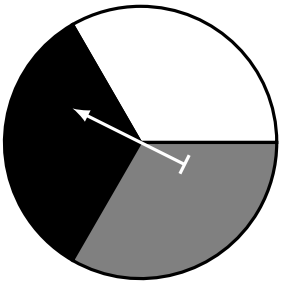
9. A bag contains only white, red and green token. There are twice as many white tokens as there are red and the number of red and green token are equal. What is the chance of picking a red token from the bag?

10. A Bag contains token as shown. Each token is either black or white and is either square or circular. Work out the probability that a token chosen at random is :

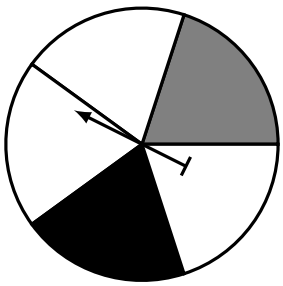


   $P(\text{black}) = \ldots\ldots$
   $P(\text{black and circular}) = \ldots\ldots$
   $P(\text{white and circular}) = \ldots\ldots$
   $P(\text{square and not black}) = \ldots\ldots$

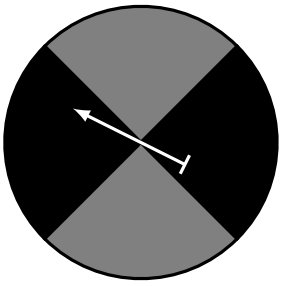
11. Each spinner has equally-sized sector. Work out the porbability of each spinner landing on white.



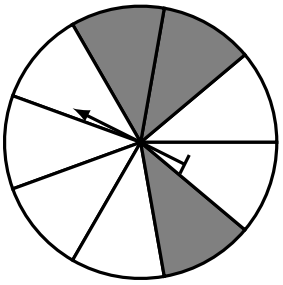
$P(\text{white}) =$



$P(\text{white}) =$

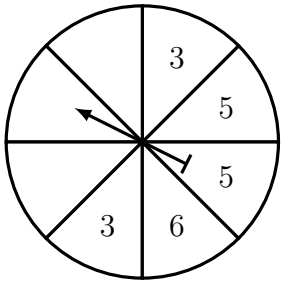


$P(\text{white}) =$

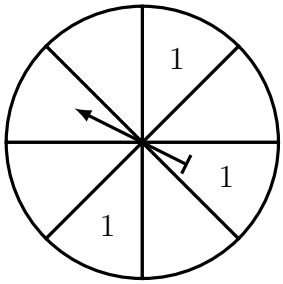


$P(\text{white}) =$

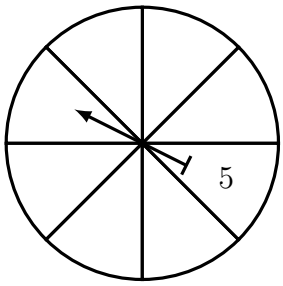
Exercise 2 — design a spinner!. Using only the numbers 1-6, complete these spinners so they match the probability statements that describe them.



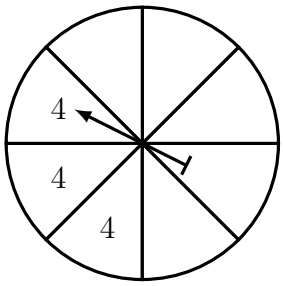
The chance of getting a 1 is zero. You are more likely to get a 2 than a 3. You have no chance of getting a 4.



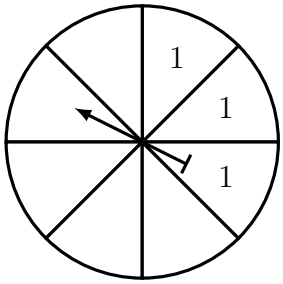
You are twice as likely to land on a 4 than a 3. You are certain to get a number less than 5. It is impossible to land on a 2.



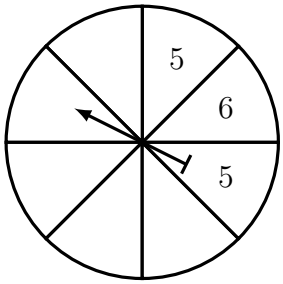
You have a 50% chance of landing on a 3. You are more likely to land on a 6 than a 4. You have no chance of landing on a number less than 3.



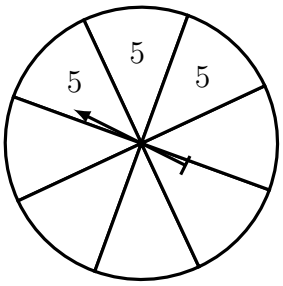
You are certain to land on a multiple of 2. You are most likely to land on a number less than 4. You are not very likely to land on a 6.



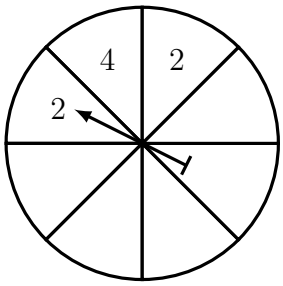
It is impossible to land on an even number. You are most likely to get a 3. You are certain to get a number less than 4.



You are unlikely to land on a 3 or 4. You are most likely to land on a 2. You are certain to land on a number more than 1.



You are certain to land on an odd number. You have a 25% chance of landing on a 1. You are twice as likely to land on 5 than 3. You have a 25% chance of landing on a multiple of 3. It is impossible to land on a 6. There are more 5's than 2's. You are certain to land on a number more than 1.



Exercise 3

Read carefully the XKCD strip. In everyday english, what expressions of uncertainty do people mix up ?