

## Section 1: Working with probability

### Section test

- A school has four houses: Red, Yellow, Green and Blue. Of the 200 pupils in year 9, 40 are in 'Red' house, 62 in 'Yellow' house and 52 in 'Green' house.  
What is the probability that a pupil chosen at random is 'Blue' house?  
What is the probability that a pupil chosen at random is not in either 'Yellow' house or 'Green' house?
- Tickets numbered 2 to 101 are placed in a hat and a single ticket is chosen at random.  
What is the probability of selecting a ticket with an even number?  
What is the probability of selecting a ticket with a number which is not a square number?  
What is the probability of selecting a ticket with a number containing the digit 5?
- The probability that Michael makes a mistake when typing a symbol is 0.005. Find the probability that Michael makes no mistakes when typing 500 symbols.
- A bag contains 20 balls of which  $x$  are black,  $2x$  are white and 8 red. A ball is selected at random from the bag. What is the probability that it is not black?
- A card is drawn at random from a pack of 52 playing cards. Which pair of events A and B is **not** mutually exclusive?  
(a) A: a 10 is drawn; B: a club is drawn      (b) A: a 7 is drawn; B: an ace is drawn  
(c) A: a diamond is drawn; B: a heart is drawn      (d) A: an ace is drawn; B: a queen is drawn
- A bag contains 4 red and 6 blue marbles. A marble is chosen at random and then replaced in the bag. A second marble is now chosen at random. What is the probability that both marbles are the same colour?
- Maya did a survey of all the 258 children in her primary school about their pets. She drew the two-way table below.

	Has one or more dogs	Does not have a dog	
Has one or more cats	32		
Does not have a cat	78	103	181
	110		258

A child is selected at random from the school. What is the probability that the child selected owns one or more cats but no dogs?

- A coin is biased so that the probability of a 'head' is 0.4. What is the probability that when the coin is tossed twice there will be one head and one tail?

## Edexcel AS Maths Probability 1 section test solutions

9. In a sixth form of 234 students, 108 study English, 52 study History, and 25 study both English and History.  
A student is selected at random. Find the probability that the student studies neither English nor History.
10. On my way to school I pass through two sets of traffic lights that operate independently. The probabilities that I have to wait at these two sets of traffic lights are 0.3 and 0.4 respectively. What is the probability that I am delayed by at least one of the sets of traffic lights?

# Edexcel AS Maths Probability 1 section test solutions

## Solutions to section test

1. The number of pupils in Blue house =  $200 - 40 - 62 - 52 = 46$

$$P(\text{Blue}) = \frac{46}{200} = 0.23$$

The number of pupils in Red or Blue =  $40 + 46 = 86$

$$P(\text{not in either Yellow or Green}) = \frac{86}{200} = 0.43$$

2. There are 100 tickets in total. 50 of these are even.

$$P(\text{even number}) = \frac{50}{100} = \frac{1}{2}$$

The square numbers are 4, 9, 16, 25, 36, 49, 64, 81, 100.

There are 9 square numbers, so there are 91 numbers which are not squares.

$$P(\text{not a square number}) = \frac{91}{100}$$

The numbers containing the digit 5 are 5, 15, 25, 35, 45, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 65, 75, 85, 95.

There are 19 of these numbers.

$$P(\text{contains digit 5}) = \frac{19}{100}$$

3. Probability of not making a mistake = 0.995

$$\text{Probability of not making a mistake in 500 symbols} = 0.995^{500} = 0.0816 \text{ (3 s.f.)}$$

4.  $x + 2x + 8 = 20$

$$3x = 12$$

$$x = 4$$

Number of balls which are not black =  $20 - 4 = 16$

$$P(\text{not black}) = \frac{16}{20} = 0.8$$

5. A card cannot be both a 7 or an ace.

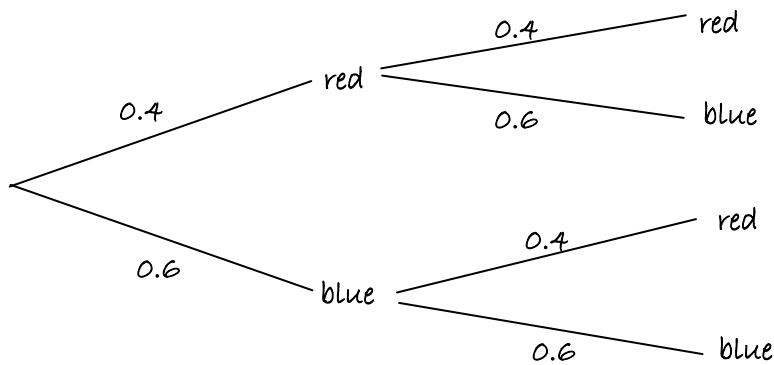
A card cannot be both a diamond and a heart.

A card cannot be both an ace and a queen.

However, a card can be both a 10 and a club, so these are not mutually exclusive events.

# Edexcel AS Maths Probability 1 section test solutions

6.



$$P(\text{both red}) = 0.4 \times 0.4 = 0.16$$

$$P(\text{both blue}) = 0.6 \times 0.6 = 0.36$$

$$P(\text{both red or both blue}) = 0.16 + 0.36 = 0.52$$

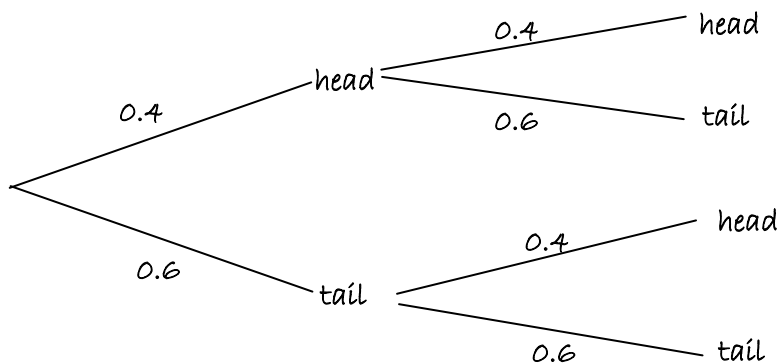
7. The complete table is as follows:

	Has one or more dogs	Does not have a dog	
Has one or more cats	32	45	77
Does not have a cat	78	103	181
	110	148	258

So there are 45 children with one or more cats but no dogs.

$$\text{The probability is } \frac{45}{258} = 0.174 \text{ (3 s.f.)}$$

8.



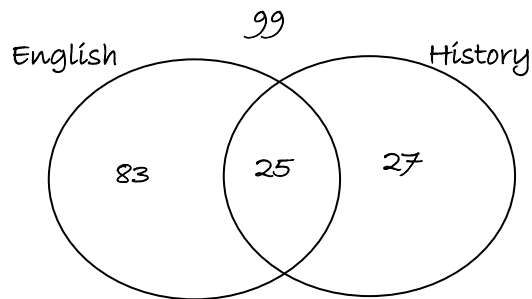
$$P(\text{HT}) = 0.4 \times 0.6 = 0.24$$

$$P(\text{TH}) = 0.6 \times 0.4 = 0.24$$

$$P(\text{one head and one tail}) = 0.24 + 0.24 = 0.48$$

## Edexcel AS Maths Probability 1 section test solutions

9. The venn diagram shows that there are 99 students taking neither English nor History.



$$P(\text{neither English nor History}) = \frac{99}{234} = 0.423 \text{ (3 s.f.)}$$

10.  $P(\text{not delayed by set 1}) = 1 - 0.3 = 0.7$   
 $P(\text{not delayed by set 2}) = 1 - 0.4 = 0.6$   
 $P(\text{delayed by neither set}) = 0.7 \times 0.6 = 0.42$   
 $P(\text{delayed by at least one}) = 1 - 0.42 = 0.58$