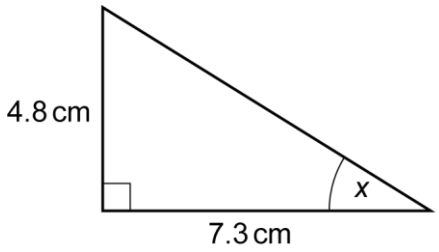
6 The diagram shows a right-angled triangle.



Not to scale

(a) Calculate the area of the triangle.

(a) ……..…… cm^2 **[2]**

(b) Calculate angle *x*.

(b) *x* = ……° **[3]**

7 George invests £15 000 at 4.5% per year simple interest.

Find the total value of his investment after 3 years.

£ ……**[3]**

8 **(a)** Calculate $\sqrt[3]{58^2 + 11}$.

(a) ……**[2]**

(b) Work out the number of seconds in a year.

(b) ……**[2]**

(c) Write down the reciprocal of 16.

(c) ……**[1]**

9 This is the notice in a lift.

Warning

Maximum 15 people

Maximum load 1200 kg

The average weight of a person in the UK is 76.9 kg.

(a) Use this information to decide if it is safe for the lift to hold the maximum number of people stated.

.....**[3]**

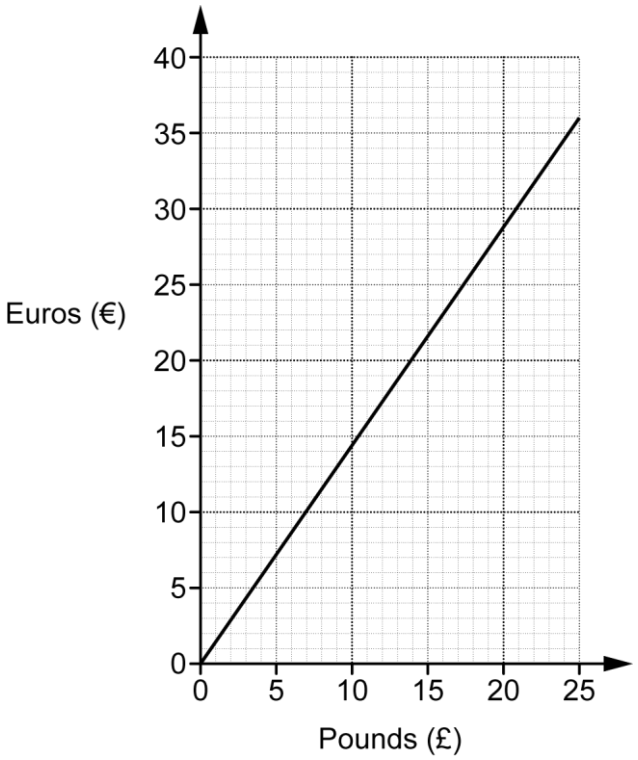
(b) Comment on the reliability of your answer.

.....

.....

.....**[1]**

10 This is a conversion graph between pounds and euros.



(a) The exchange rate is £1 = € *n*.

Find the value of *n*.

(a) ……..**[2]**

(b) An article costs €76.

Explain how to use the graph to find the cost in pounds.

.....

.....

..... **[2]**

11 $A = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 7$
$B = 2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 7$

(a) Write A using index notation.

(a) ……..**[1]**

(b) Show that the highest common factor (HCF) of A and B is 1260. **[2]**

(c) Show that B is larger than A, **without working them out**. **[2]**

12 **(a)** The width of a piece of wood, w cm, is 7.4 cm, correct to 1 decimal place.

Complete this statement about the value of w.

…….$\leqslant w <$……..**[2]**

(b) The attendance at a football match is reported as 5900.

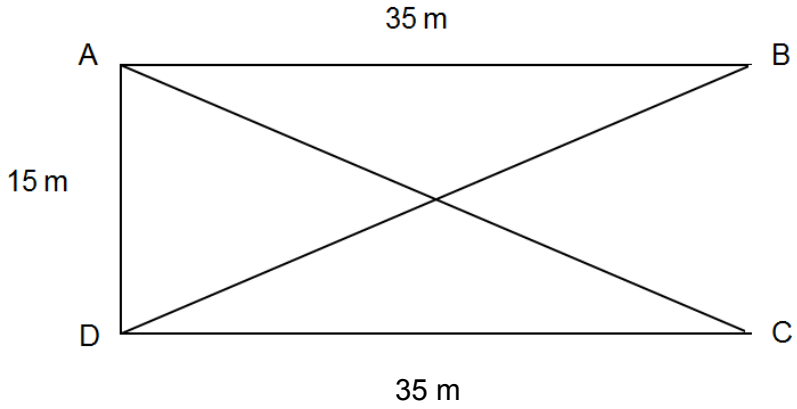
Explain, with an example, why this may not be the exact attendance.

.....

.....**[2]**

13 The diagram below shows five paths.

ADC and DAB are right-angled triangles.



Not to scale

It costs £2.50 per metre to clean these paths.

Find the total cost of cleaning all five paths.

£……..…… **[6]**

14 A game uses two fair spinners.

Spinner A has 6 sides numbered 2, 4, 6, 6, 6 and 8.
Spinner B has 5 sides numbered 1, 3, 5, 7 and 9.

Both spinners are spun and the two scores are added together.

Show that the probability of getting a total of 7 is $\frac{1}{6}$. **[4]**

15 **(a)** 12 is one factor of the integer N.

Write down two other factors of N.

(a) …… and …… **[1]**

(b) The integer S is a square number.

Explain why S cannot be a prime number.

.....

.....**[1]**

16 Here is some information from three packets of food.

Burgers	Sausages	Meatballs
Total weight 440 g of which 154 g is fat	Total weight 350 g of which 120 g is fat	Total weight 330 g of which 116 g is fat

Which food has the highest proportion of fat?
Show how you decide.

…….. **[4]**

17 Here is a statement.

Multiply two prime numbers together and the result is a prime number.

Explain why this statement is not correct.
Give an example to support your explanation.

.....

.....**[2]**

18 A bag contains 20 balls.
Every ball is red or blue or green.

(a) Anjum takes a ball at random from the bag.
She notes its colour and replaces it.

She repeats this process 20 times.
8 of the balls she takes are red.

Anjum says

There are 8 red balls in the bag.

Explain why she may be wrong.

.....

..... **[1]**

(b) Dan takes a ball at random from the bag.
He notes its colour and replaces it.

He repeats this process 120 times.

His results are shown in the table.

Colour	Red	Blue	Green
Frequency	66	47	7

Estimate the number of balls of each colour in the bag.

(b) Red ……

Blue ……

Green …….. **[3]**

19 Karl and Lisa invest £5800 in a savings account.

The account pays a fixed rate of 2.3% per year compound interest for 5 years.

(a) Karl calculates that they will have £5162.98 in the account at the end of 5 years.

Without working out the correct answer, explain how you can tell that Karl's calculation is wrong.

.....

..... **[1]**

(b) Here is Lisa's calculation to work out how much they will have at the end of 5 years.

$£5800 \times 2.3^5 = £373\,307.89$

Explain what Lisa has done wrong.

.....

..... **[1]**

(c) Calculate how much they will have in the account at the end of 5 years.

(c) £ ..... **[3]**

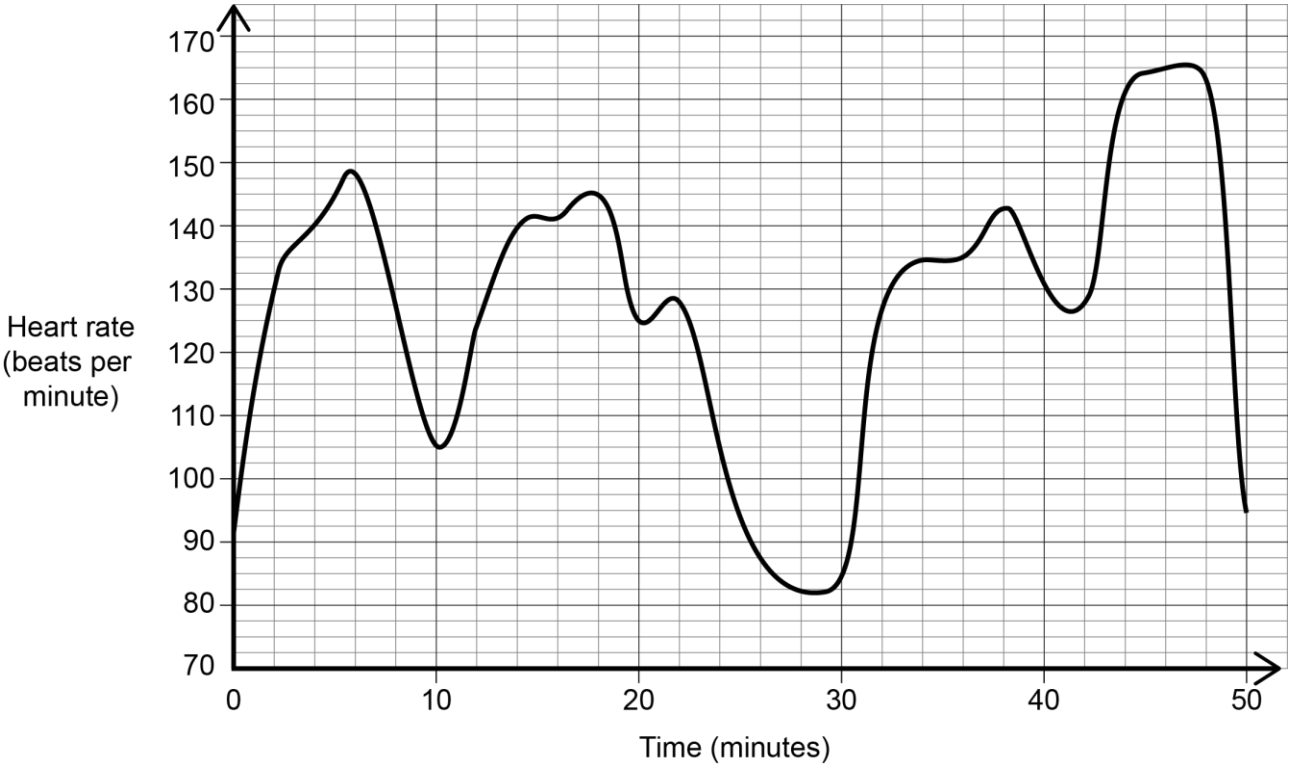
20 A person's maximum heart rate, in beats per minute, can be calculated using this formula.

Maximum heart rate = 220 – age in years

This table gives information about a person's expected heart rate while they are exercising.

Exercise intensity		Heart rate zone
Exercise zone	Peak	Greater than 85% of maximum heart rate
	Cardio	Between 70% and 85% of maximum heart rate
	Fat burn	Between 50% and 70% of maximum heart rate
Out of exercise zone		Below 50% of maximum heart rate

Zoe is 45 years old.
She wears a heart rate monitor while she is exercising.
The graph shows her heart rate during her exercise session.



(a) Use the formula to calculate Zoe's maximum heart rate.

(a) ……. beats per minute **[1]**

(b) Estimate the number of minutes Zoe spent working at **cardio** intensity during this session.

Show clearly how you make your estimate.

(b) ……. minutes **[4]**

(c) Zoe says

My heart rate was in the **exercise zone** for 50 minutes in my session.

Explain why Zoe is not correct.

.....

.....**[1]**

21 Maya is 6 years younger than Ned.
Peter is 3 times as old as Ned.
The sum of their three ages is 109.

Work out Peter's age.

……..**[4]**

22 A concrete slab is a cuboid.

It measures 400 mm by 400 mm by 28 mm.
The density of the concrete is 2250 kg/m^3.

Calculate the total mass of 60 slabs.

..... kg **[4]**

END OF QUESTION PAPER