

CHELtenham
COLLEGE

14+ Entrance Examination Paper
2018-19

MATHEMATICS

Time allowed: - 60 minutes

Calculators **MAY** be used

Instructions

- Write your name in the space at the bottom of the page
- Answer questions on the paper, showing all necessary working. If you need extra paper make sure that it is named and included with this paper when you hand it in.
- Do not spend too long on any one question. You may not be able to answer every question.
- Answers should be given to 3 significant figures unless otherwise stated in the question.

Advice

- Marks will be earned for showing the correct method as well as the answers.
- All questions are worth 1 mark unless stated otherwise.

Candidate's name: _____

1a) Write to 2 decimal places 54327.296 (1 mark)

b) Write 54327.296 correct to 2 significant figures (1 mark)

c) Write 54327.296 correct to 4 significant figures (1 mark)

2a) List all the factors of 57 (2 marks)

b) List the first 3 multiples of 15 (2 marks)

c) Write 114 as a product of primes (2 marks)

3) Give full workings to show that:

a) $\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$ (2 marks)

b) $1\frac{9}{15} + \frac{2}{7} = 1\frac{31}{35}$ (3 marks)

c) $\frac{3}{5} \div \frac{2}{15} = 4\frac{1}{2}$ (2 marks)

4) In 2018 World Cup football matches, the ball is on average in play (i.e on the pitch) for $\frac{2}{3}$ of the total time (90 minutes)

a) Write $\frac{2}{3}$ as a percentage. (1 mark)

b) Calculate how much time the ball was in play on average. (2 marks)

c) A family arrive to watch a game 30 minutes before kick off. Taking into consideration a 15 minute break at half time and assuming they leave instantly after the final whistle, calculate the percentage of their total time at the ground they spend watching football. (2 marks)

d) In 2009 Real Madrid paid £80,000,000 to sign Cristiano Ronaldo from Manchester United. In 2018 he was sold for £105,000,000 to Juventus. What was the percentage increase in his transfer value? (2 marks)

5) The radius of a circle is 14cm. Calculate the following, **giving your answers to 3 significant figures**.

a) The circumference of the circle. (2 marks)

b) The area of the circle. (2 marks)

c) A cylinder has radius 6 cm and height 19cm. Calculate the volume of the cylinder. (2 marks)

6) Simplify the following as fully as possible:

a) $12x + 7y - 4x - y + 9x =$ (2 marks)

b) $3(2x + 3) - 8(4x - 5) =$ (2 marks)

c) $(2x + 4)(3x - 3) =$ (2 marks)

d) $3x^6 \times 4x^9 =$ (2 marks)

d) $\frac{16x^4}{y^3} \div \frac{8x^5y^5}{y} =$ (3 marks)

e) $(4x^4)^2$ (2 marks)

7) Solve the following:

a) $7x - 2 = 40$ (2 marks)

b) $8x + 7 = 20 - 5x$ (2 marks)

c) $6x + 1 = 10 - 2(5x - 4)$

(2 marks)

d) $2x^2 - 7 = 25$

(2 marks)

8)

* The diagram shows the floor plan of Mary's conservatory.

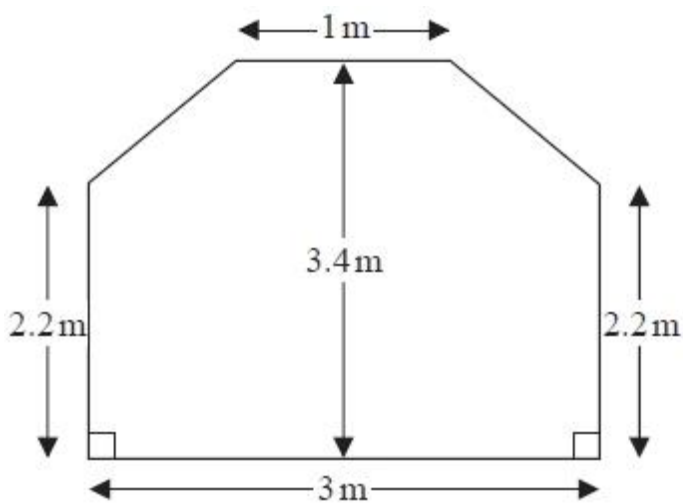


Diagram NOT
accurately drawn

Mary is going to cover the floor with tiles.

The tiles are sold in packs.

One pack of tiles will cover 2m^2

A pack of tiles normally costs £24.80

Mary gets a discount of 25% off the cost of the tiles.

Mary has £100

Does Mary have enough money to buy all the tiles she needs?

You must show all your working.

(5 marks)

9)

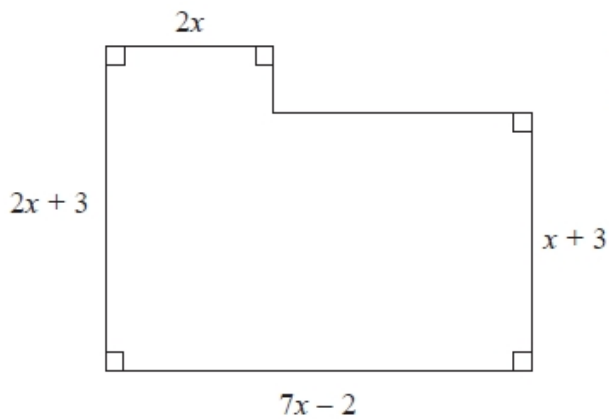


Diagram NOT accurately drawn

All the measurements in the diagram are in centimetres.

The area of the shape is $A \text{ cm}^2$.

Find a formula for A in terms of x .

You must write your formula as simply as possible.

(3 marks)

10)

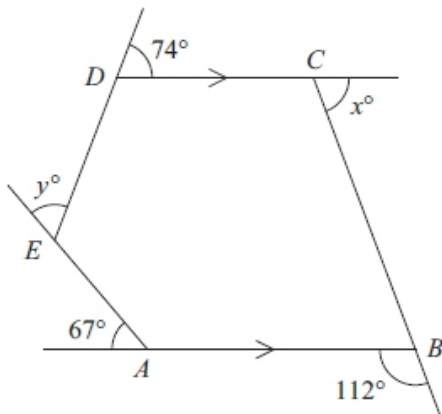


Diagram NOT accurately drawn

The diagram shows a pentagon $ABCDE$.

DC is parallel to AB .

(a) (i) Work out the value of x .

$x = \dots\dots\dots$

(ii) Work out the value of y .

$y = \dots\dots\dots$

(b) Work out the sum of the interior angles of the pentagon $ABCDE$.

$\dots\dots\dots^\circ$

(6 Marks)

11) The size of the **exterior** angles of a regular polygon is 40° .
What is the size of the sum of the **exterior** angles of this shape?

(2 marks)

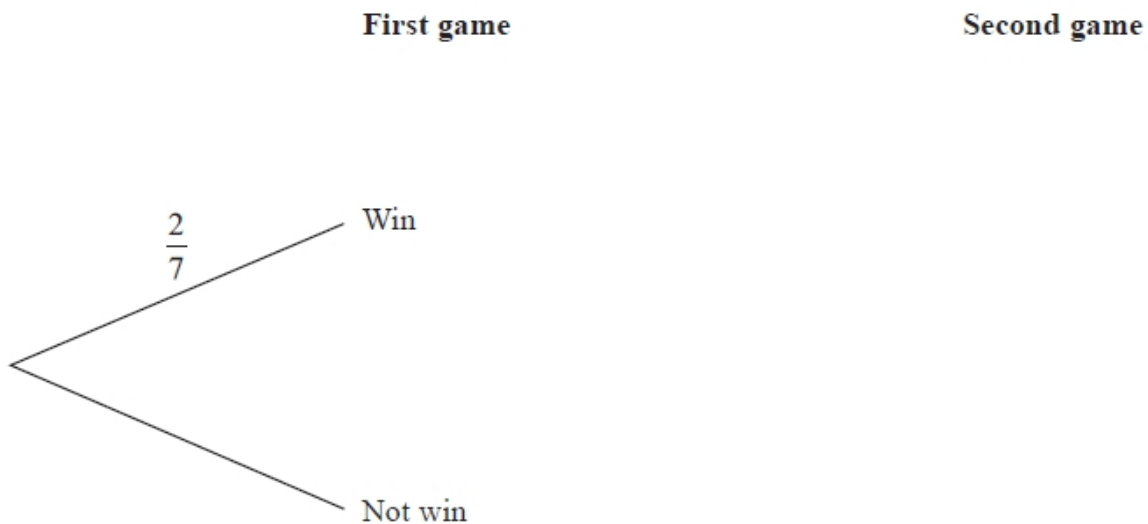
12)

Alan plays two games of tennis.

Each time he plays a game of tennis, the probability that he will win is $\frac{2}{7}$

(a) Complete the probability tree diagram.

(3 marks)



(b) Work out the probability that Alan wins at least 1 match.

(3 marks)

Alan takes part in a third match.

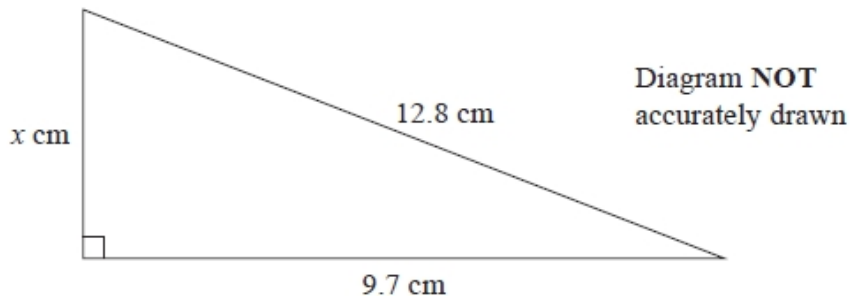
The probability that he loses the third match is 0.35

(c) Work out the probability that he wins exactly one of the three matches.

(2 Marks)

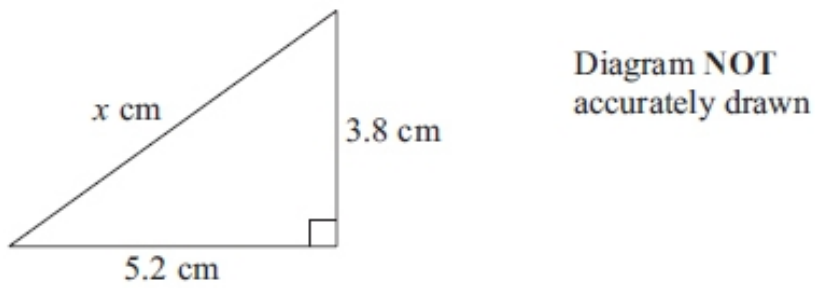
13) In each triangle find the value shown.

a)



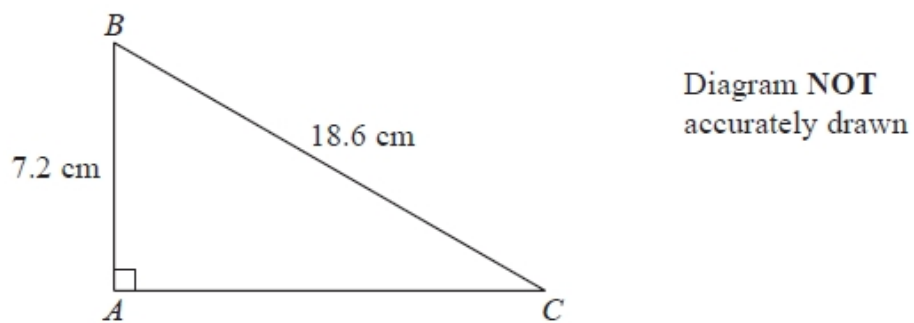
(2 marks)

b)



(2 marks)

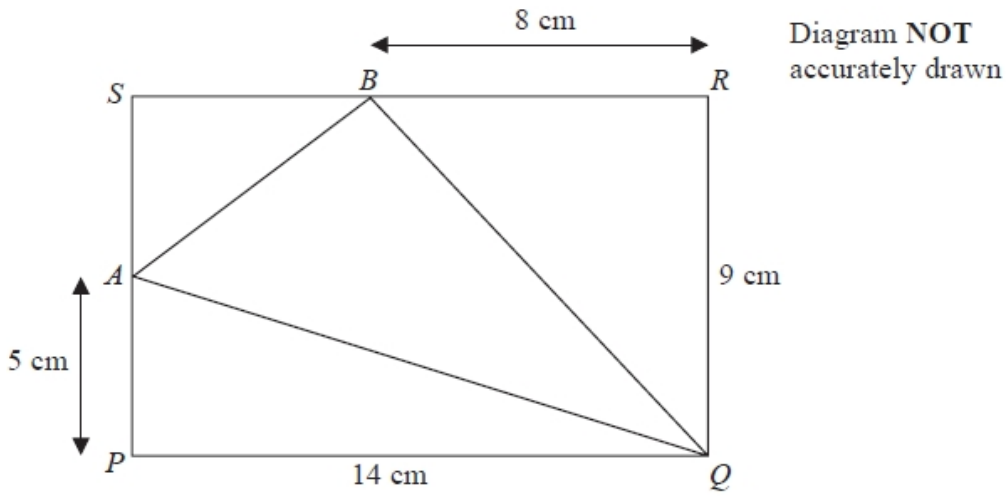
c) Find length AC



(2 marks)

14)

The diagram shows a rectangle $PQRS$.
 $PQ = 14$ cm and $QR = 9$ cm.
The point A lies on PS so that $PA = 5$ cm.
The point B lies on SR so that $BR = 8$ cm.



(a) Work out the area of triangle AQB .

..... cm^2

(b) Work out the perimeter of triangle ABQ .
Give your answer correct to 3 significant figures.

..... cm

(7 marks)

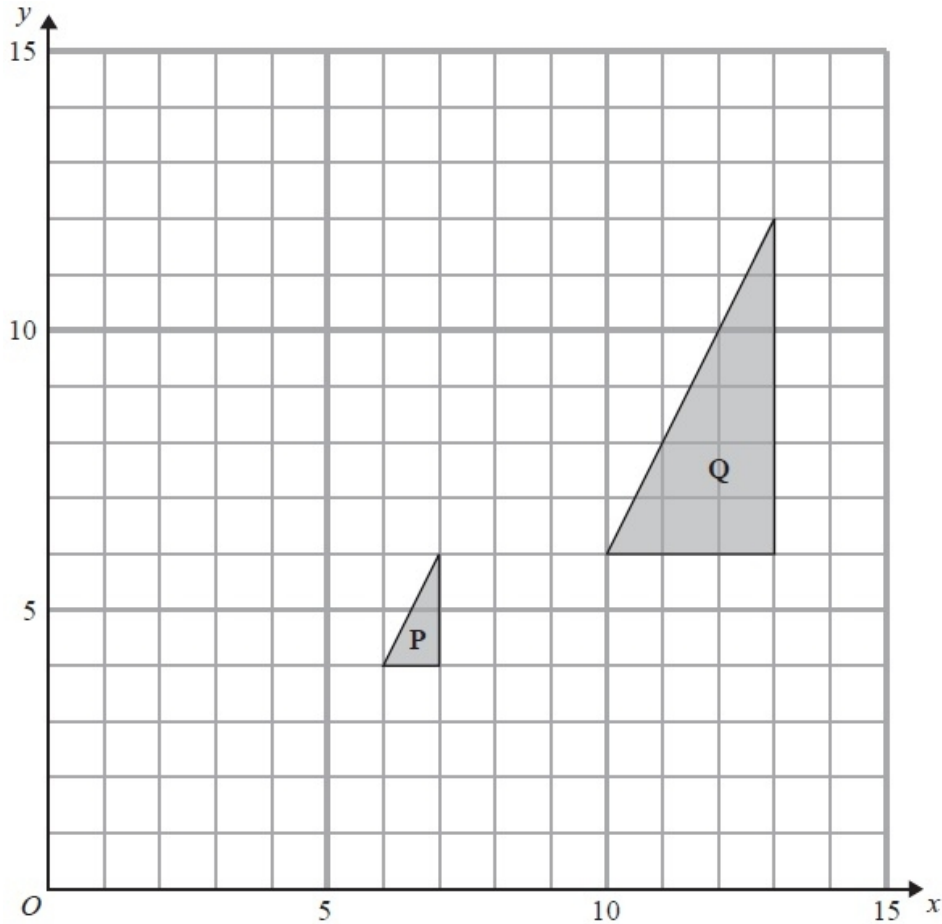
14) Solve the simultaneous equation

$$2x + 3y = 8$$

$$3x - y = 23$$

(3 marks)

15)



(a) Describe fully the single transformation which maps triangle **P** onto triangle **Q**.

.....
.....

(3)

(b) On the grid, translate triangle **Q** by the vector $\begin{pmatrix} -8 \\ 2 \end{pmatrix}$

Label the new triangle **R**.

(1)

(c) Describe fully the single transformation which maps triangle **R** onto triangle **P**.

.....
..... (2)

(6 marks)

16) For the sequence 25, 22, 19, 16....

a) Write down the next two number in the sequence

(2 marks)

b) Write a formula for the nth term of the sequence

(2 marks)

Total marks 100