Year 10 Higher Mock

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**

Information

- The total mark for this paper is 50.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1   The scatter graph shows the maximum temperature and the number of hours of sunshine in fourteen British towns on one day.
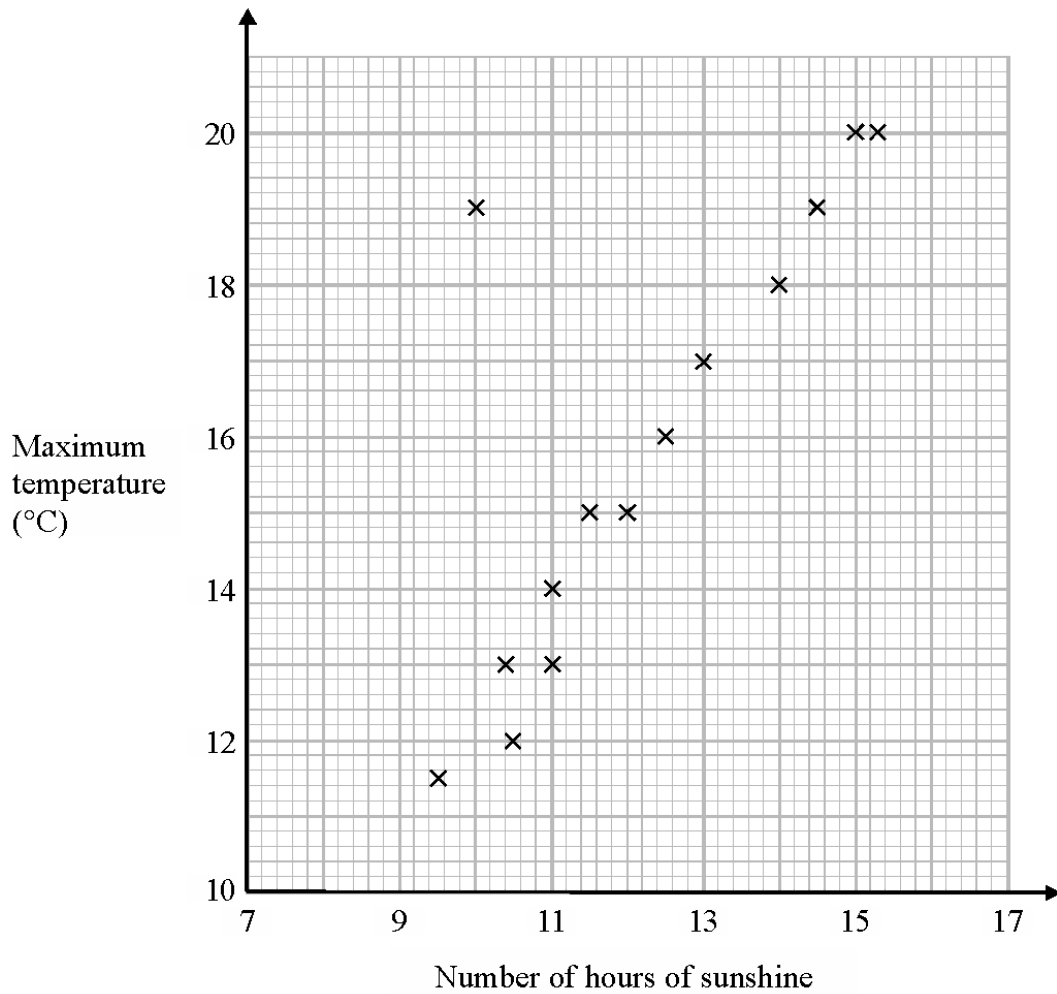
One of the points is an outlier.

(*a*) Write down the coordinates of this point.

(......................... , ...)
(1)

(*b*) For all the other points write down the type of correlation.

....
(1)

On the same day, in another British town, the maximum temperature was 16.4°C.

(*c*) Estimate the number of hours of sunshine in this town on this day.

.... hours

(2)

(Total for Question 1 is 4 marks)

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2   Express 56 as the product of its prime factors.

....

(Total for Question 2 is 2 marks)

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3 Work out 54.6 × 4.3

....

(Total for Question 3 is 3 marks)
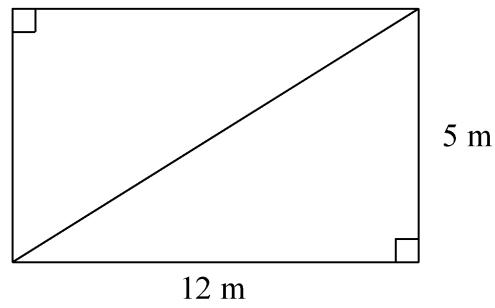
5

4
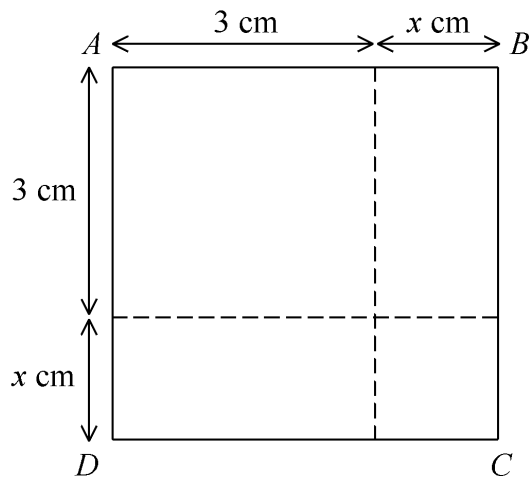
The area of square *ABCD* is 10 cm².

Show that $x^2 + 6x = 1$

(Total for Question 4 is 3 marks)

5   This rectangular frame is made from 5 straight pieces of metal.

The weight of the metal is 1.5 kg per metre.

Work out the total weight of the metal in the frame.

.... kg

(Total for Question 5 is 5 marks)

6   The equation of the line L_1 is $y = 3x - 2$
The equation of the line L_2 is $3y - 9x + 5 = 0$

Show that these two lines are parallel.

(Total for Question 6 is 2 marks)

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7   (*a*) Write 7.97×10^{-6} as an ordinary number.

....
(1)

(*b*) Work out the value of $(2.52 \times 10^5) \div (4 \times 10^{-3})$
Give your answer in standard form.

....
(2)
(Total for Question 8 is 3 marks)

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8 Jules buys a washing machine.

20% VAT is added to the price of the washing machine.
Jules then has to pay a total of £600.

What is the price of the washing machine with **no** VAT added?

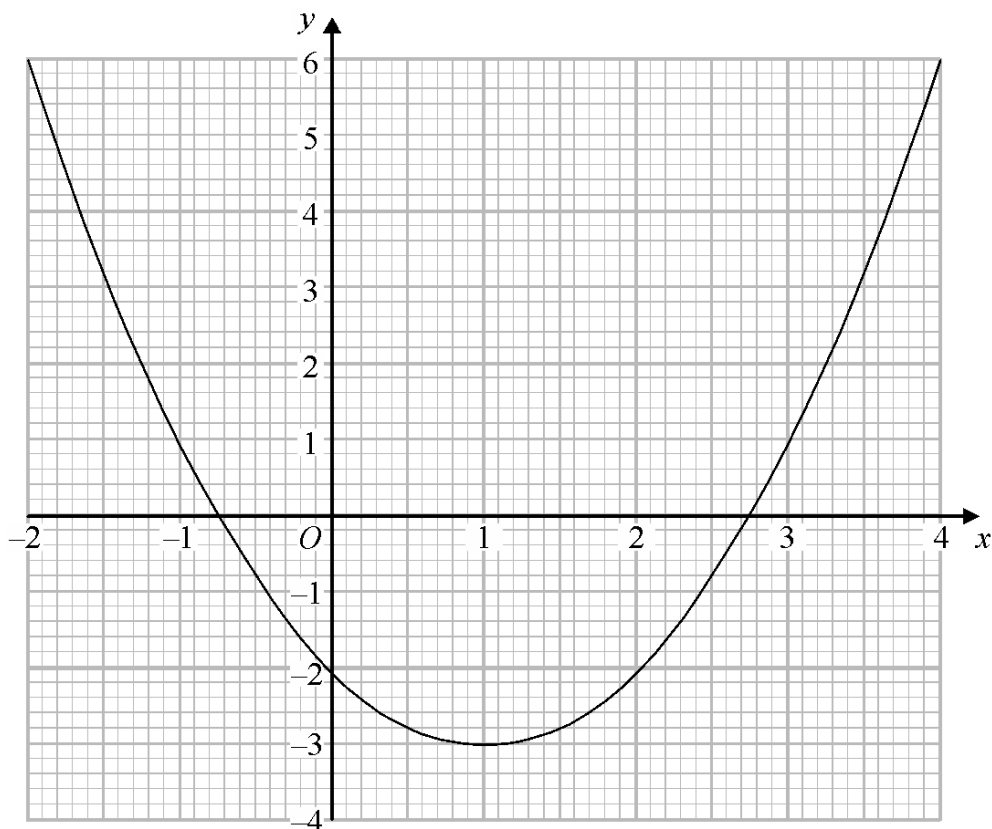£...

(Total for Question 9 is 2 marks)

9 Show that $(x + 1)(x + 2)(x + 3)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a, b, c and d are positive integers.

(Total for Question 10 is 3 marks)

10 The graph of $y = f(x)$ is drawn on the grid.

(a) Write down the coordinates of the turning point of the graph.

(.......................... , ...)

(1)

(b) Write down estimates for the roots of $f(x) = 0$

....

(1)

(c) Use the graph to find an estimate for $f(1.5)$

....

(1)

(Total for Question 11 is 3 marks)

11 (*a*) Find the value of $81^{-\frac{1}{2}}$

....
(2)

(*b*) Find the value of $\left(\dfrac{64}{125}\right)^{\frac{2}{3}}$

....
(2)

(Total for Question 12 is 4 marks)

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12 The table shows a set of values for *x* and *y*.

x	1	2	3	4
y	9	$2\frac{1}{4}$	1	$\dfrac{9}{16}$

y is inversely proportional to the square of *x*.

(*a*) Find an equation for *y* in terms of *x*.

....
(2)

(*b*) Find the positive value of *x* when *y* = 16

....
(2)

(Total for Question 13 is 4 marks)

12

13 White shapes and black shapes are used in a game.
Some of the shapes are circles.
All the other shapes are squares.

The ratio of the number of white shapes to the number of black shapes is   3:7

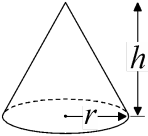The ratio of the number of white circles to the number of white squares is   4:5

The ratio of the number of black circles to the number of black squares is   2:5

Work out what fraction of all the shapes are circles.

....

(Total for Question 14 is 4 marks)

14 A cone has a volume of 98 cm³.
The radius of the cone is 5.13 cm.

$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$$

(*a*) Work out an estimate for the height of the cone.

....cm

(3)

John uses a calculator to work out the height of the cone to 2 decimal places.

(*b*) Will your estimate be more than John's answer or less than John's answer?
Give reasons for your answer.

....

....

....

(1)

(Total for Question 15 is 4 marks)

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15 *n* is an integer greater than 1

Prove algebraically that $n^2 - 2 - (n - 2)^2$ is always an even number.

(Total for Question 16 is 4 marks)

TOTAL FOR PAPER IS 50 MARKS