Candidates answer on the Question Paper.

OCR supplied materials:
None
Other materials required:
• Geometrical instruments
• Tracing paper (optional)

INSTRUCTIONS TO CANDIDATES

• Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
• Use black ink. HB pencil may be used for graphs and diagrams only.
• Answer all the questions.
• Read each question carefully. Make sure you know what you have to do before starting your answer.
• Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
• Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
• Do not write in the bar codes.

INFORMATION FOR CANDIDATES

• The number of marks is given in brackets [ ] at the end of each question or part question.
• Your quality of written communication is assessed in questions marked with an asterisk (*).
• The total number of marks for this paper is 60.
• This document consists of 16 pages. Any blank pages are indicated.

WARNING
No calculator can be used for this paper

Duration: 1 hour

Candidate forename

Candidate surname

Centre number

Candidate number

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Turn over
Area of trapezium = $\frac{1}{2} (a + b)h$

Volume of prism = (area of cross-section) × length

In any triangle $ABC$

Sine rule \[ \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \]

Cosine rule \[ a^2 = b^2 + c^2 - 2bc \cos A \]

Area of triangle = $\frac{1}{2} \, ab \sin C$

Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$

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

Curved surface area of cone = $\pi rl$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

\[ x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a} \]
1. Mikey has £15.45 in his wallet.

(a) The money is made up of 2 notes and 8 coins, none of which are 10p coins.

Show how this could be done. [2]

(b) Mikey buys a pad of paper for £2.49 and a pack of pens for £1.99.

(i) How much money will he have left?

(b)(i) £ ........................................................... [3]

(ii) Use estimation to check your answer to part (b)(i).

Make your method of checking clear. [2]
Arrange the answers to the following in order of size, starting with the smallest.

\[
\begin{align*}
\frac{1}{5} \text{ of } 1200 & \quad 14 \text{ squared} & \quad 3^4 & \quad 25\% \text{ of } 664
\end{align*}
\]
3  (a) (i) Write the algebraic inequality represented on this number line.

\[ \bullet \quad \circ \]

2  3  4  5  6  7  8  9  10  11  12

\[ x \]

(a)(i) .......................................................... [3]

(ii) Write down all the integers that satisfy the inequality in part (a)(i).

(ii) .......................................................... [2]

(b) Solve.

\[-5x > 20\]

(b) .......................................................... [2]
Yuki inscribed a regular pentagon in a circle, centre O.

(a) Show that angle $p$ is $72^\circ$. [1]

(b) Calculate the sum of the interior angles of a regular pentagon. [2]
(c) The diagram shows a regular pentagon, ABCDE, and an equilateral triangle ABF.

Work out the size of the reflex angle $r$.

(c) ..............................................° [3]
This table shows the mean maximum temperature and the total hours of sunshine recorded at one UK weather centre each year from 1993 to 2013.

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<tbody>
<tr>
<td>Mean maximum temperature (°C)</td>
<td>11.8</td>
<td>12.4</td>
<td>13.0</td>
<td>11.7</td>
<td>13.1</td>
<td>12.6</td>
<td>13.0</td>
<td>12.6</td>
<td>12.4</td>
<td>13.0</td>
<td>13.5</td>
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<tr>
<td>Total hours of sunshine</td>
<td>1200</td>
<td>1350</td>
<td>1570</td>
<td>1380</td>
<td>1410</td>
<td>1250</td>
<td>1400</td>
<td>1350</td>
<td>1410</td>
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<td>1590</td>
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<td>13.0</td>
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<td>13.3</td>
<td>12.7</td>
<td>12.8</td>
<td>11.7</td>
<td>13.3</td>
<td>12.4</td>
<td>12.4</td>
</tr>
<tr>
<td>Total hours of sunshine</td>
<td>1360</td>
<td>1400</td>
<td>1500</td>
<td>1450</td>
<td>1390</td>
<td>1470</td>
<td>1460</td>
<td>1410</td>
<td>1340</td>
<td>1420</td>
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The results for the first 16 years are plotted on the scatter diagram.

![Scatter diagram](image_url)
(a) Complete the scatter diagram.  

(b) Describe the strength and type of correlation between mean maximum temperature and total hours of sunshine.  

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

(c) Is it appropriate to draw a line of best fit on your scatter diagram? Explain your answer.  

............................................................................................................................................................................. [1]
Find the value of $a$, the value of $b$ and the value of $c$ so that this identity is true for all values of $x$ and $y$.

$$3x + ay + 7 + bx + a \equiv x + 7y + c$$

$a = .........................................................$

$b = .........................................................$

$c = .........................................................$ [3]
Arjun has a photograph of his house.

Item removed due to third party copyright restrictions.

Arjun orders a canvas print that is mathematically similar to his photograph.

The photograph is 3 inches wide and 2 inches high.
The canvas print is 4 feet wide.
You are given that there are 12 inches in one foot.

Work out the height of the canvas print in feet and inches.

......................... feet ......................... inches [5]
A line $L$ passes through the points $(8, 0)$ and $(0, -4)$.

(a) Sketch line $L$. 

(b) Calculate the gradient of line $L$. 

(b) .......................................................... [2]

(c) Line $M$ is parallel to line $L$ and passes through the point $(0, 6)$. Write down the equation of line $M$. 

(c) .......................................................... [2]

(d) Line $N$ has the equation $y = 2x - 3$. Is line $N$ • parallel to line $L$ or • perpendicular to line $L$ or • neither parallel nor perpendicular to line $L$? Justify your choice.

...................................................................................................................................................
...................................................................................................................................................
.............................................................................................................................................. [3]
Solve, algebraically, these simultaneous equations.

\[4x + y = 8\]
\[2x - 3y = 11\]

\[x = \ldots\]
\[y = \ldots\] [4]
10  (a) Write down the value of $3^0$. 

(a) .......................................................... [1]

(b) Work out the value of the following.

\[
\frac{9^3 \times 9^{\frac{5}{2}}}{9^{\frac{3}{2}}}
\]

(b) .......................................................... [3]
11 A function is given by

\[ f(x) = 4x - 3. \]

(a) (i) Evaluate \( f(7) \).

(a)(i) .......................................................... [1]

(ii) Find the exact value of \( 2f(\sqrt{5}) \). Give your answer in the form \( a\sqrt{5} + b \).

(ii) .......................................................... [2]

(b) Find \( x \) such that \( 4f(x) + 27 = 7 \).

(b) .......................................................... [3]

END OF QUESTION PAPER