OCR
Oxford Cambridge and RSA

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Wednesday 4 November 2015 – Morning

GCSE MATHEMATICS A

A502/02 Unit B (Higher Tier)

5124055087

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Geometrical instruments
- Tracing paper (optional)

Duration: 1 hour

A502/02

Candidate forename		Candidate surname	

Centre number						Candidate number				

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

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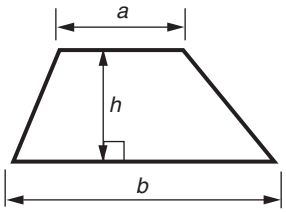
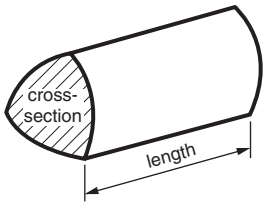
Formulae Sheet: Higher Tier

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



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

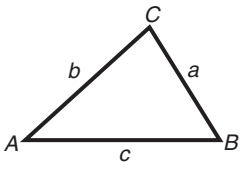


In any triangle *ABC*

Sine rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

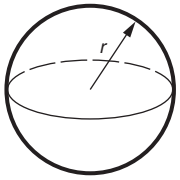
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



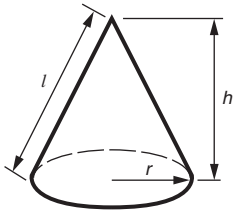
Volume of sphere $= \frac{4}{3}\pi r^3$

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



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

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

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

PLEASE DO NOT WRITE ON THIS PAGE

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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]**

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2* Arrange the answers to the following in order of size, starting with the smallest.

$\frac{1}{5}$ of 1200	14 squared	3^4	25% of 664

.... **[5]**

smallest

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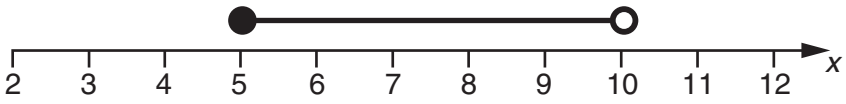
3 **(a)** **(i)** Write the algebraic inequality represented on this number line.



(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]**

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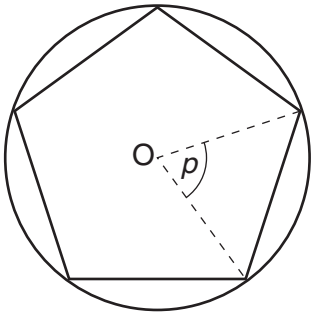
4 Yuki inscribed a regular pentagon in a circle, centre O.

(a) Show that angle p is 72°. **[1]**



Not to scale

(b) Calculate the sum of the interior angles of a regular pentagon.

(b) .....° **[2]**

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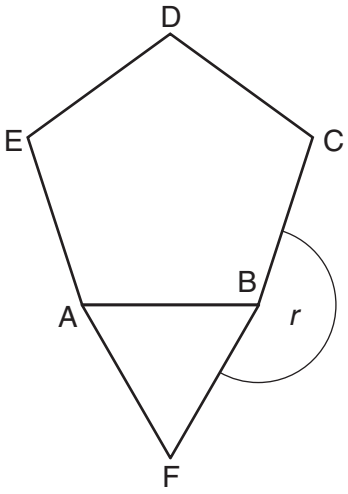
(c) The diagram shows a regular pentagon, ABCDE, and an equilateral triangle ABF.

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



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(c) ..... ° **[3]**

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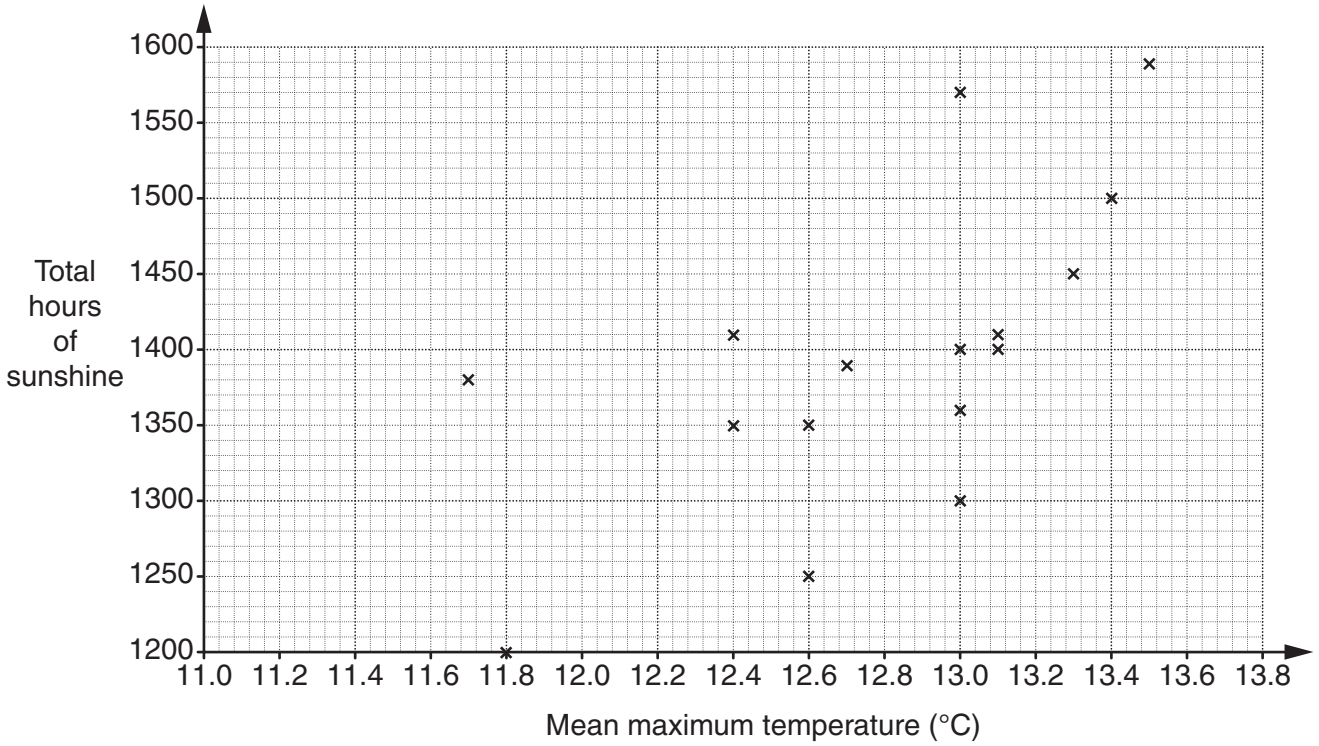
5 This table shows the mean maximum temperature and the total hours of sunshine recorded at one UK weather centre each year from 1993 to 2013.

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Mean maximum temperature (°C)	11.8	12.4	13.0	11.7	13.1	12.6	13.0	12.6	12.4	13.0	13.5
Total hours of sunshine	1200	1350	1570	1380	1410	1250	1400	1350	1410	1300	1590

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Mean maximum temperature (°C)	13.0	13.1	13.4	13.3	12.7	12.8	11.7	13.3	12.4	12.4
Total hours of sunshine	1360	1400	1500	1450	1390	1470	1460	1410	1340	1420

The results for the first 16 years are plotted on the scatter diagram.



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(a) Complete the scatter diagram. **[2]**

(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]**

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6 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]**

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7 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]**

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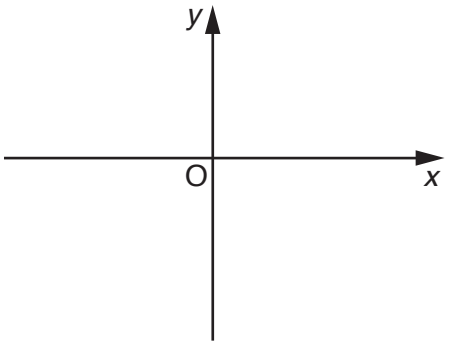
8 A line L passes through the points (8, 0) and (0, –4).

(a) Sketch line L.



[1]

(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]**

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9 Solve, algebraically, these simultaneous equations.

$$4x + y = 8$$
$$2x - 3y = 11$$

$x =$ .....

$y =$ ..... **[4]**

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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]**

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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

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