

For Edexcel

GCSE Mathematics

Unit 3 – Section A – (Non-Calculator)

Higher Tier

Terminal Paper A

Time: 1 hour 10 minutes



Materials required

Ruler, protractor, compasses, pen, pencil, eraser.
Tracing paper may be used.

Instructions and Information for Candidates

Do not write on this question paper – use blank paper and the answer sheets provided.
The total mark for this paper is 60. There are 17 questions in this paper.

Calculators must not be used.

Advice to Candidates

Show all stages in any calculation. Do not spend too long on one question.
If you cannot answer a question, leave it and return to it at the end.

Formulae: Higher Tier

Volume of a prism = area of cross section \times length

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

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

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

Curved surface area of cone = $\pi r l$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$, are given by

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



Written by Shaun Armstrong

Only to be copied for use in the purchaser's school or college

Answer ALL SEVENTEEN questions.

You must NOT use a calculator.

You must write down all the stages in your working.

1. Here are the ingredients for making 6 pots of chocolate mousse.

Ingredients

6 eggs

30 g of butter

320 g of chocolate

a pinch of salt

Frank has to make 12 pots of chocolate mousse.

- (a) How much chocolate does he need?

(2)

Later on, Frank needs to make 4 more pots.

- (b) Work out how much butter he needs to make 4 pots of chocolate mousse.

(2)

-
2. (a) Write $\frac{3}{20}$ as a decimal.

(2)

- (b) Work out $\frac{4}{9}$ of 63.

(2)

-
3. Solve $5p + 9 = p - 3$

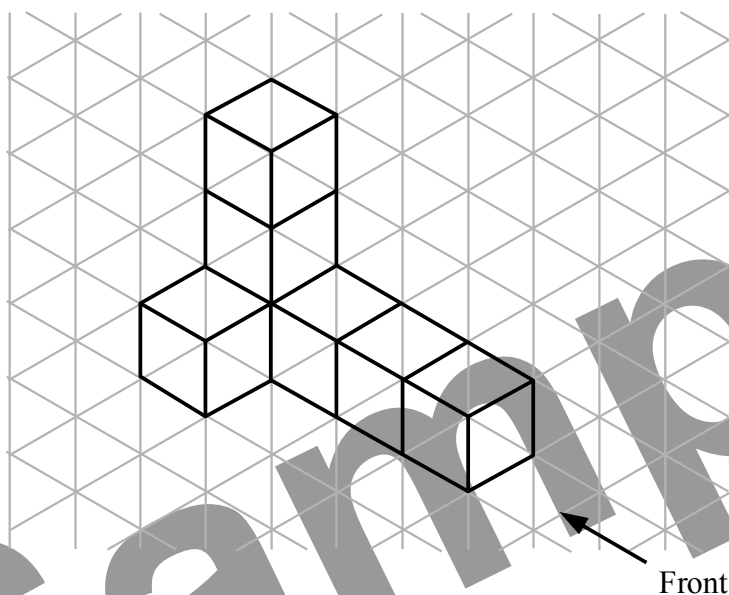
(3)

-
4. The table on the answer sheets shows some expressions.
 a , b , c and d represent lengths.
 π and 2 are numbers which have no dimensions.

Tick (✓) the boxes underneath the **three** expressions which could represent volumes.

(3)

5. The diagram shows a 3-D shape made from cubes.



- (a) On the grid on the answer sheets, draw the front elevation of the shape from the direction shown. (2)
- (b) On the grid on the answer sheets, draw the plan of the shape. (2)

6. (a) Work out the value of $6p + 5q$ when $p = 3$ and $q = -2$. (2)
- (b) Expand and simplify $(a - 4)(a + 4)$ (2)

7.

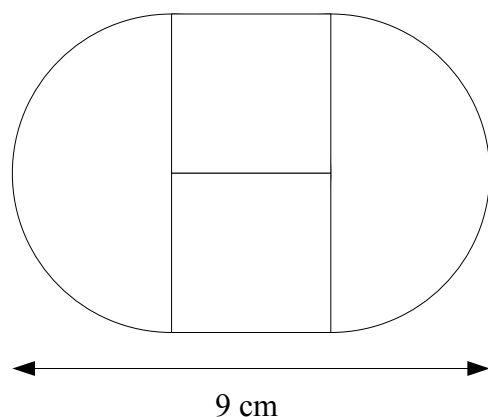


Diagram **NOT** accurately drawn

The shape above is made from two squares and two semi-circles.

The radius of each semi-circle is the same as the length of the side of each square.
The length of the shape is 9 cm.

Find the area of the shape. Give your answer in terms of π .

(4)

8. Tariq's bicycle has three gears.
The numbers of teeth on the gears are in the ratio $5 : 6 : 7$
In total there are 36 teeth on the gears.

Work out how many teeth are on the middle gear.

(3)

9. Triangle ABC is shown on the answer sheets.

Shade the region inside the triangle which is nearer to point A than point C and less than 5 cm from the point C .

(4)

10. Work out $4\frac{1}{5} - 1\frac{2}{3}$

(3)

11. The ages of three sisters are x years, x^2 years and $(3x - 2)$ years.
The total of the ages of the three sisters is 30 years.

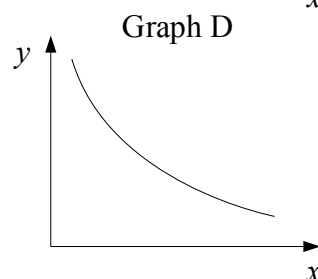
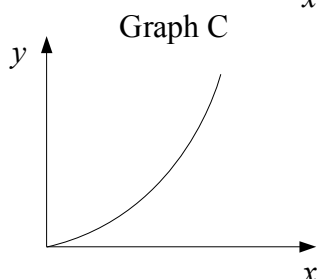
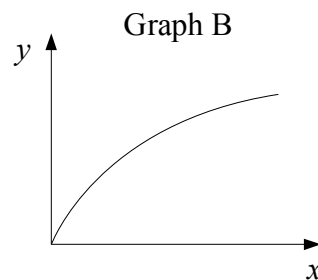
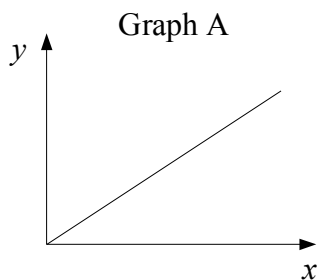
(a) Show that $x^2 + 4x - 32 = 0$

(2)

- (b) Find the age of the oldest of the three sisters.

(3)

12. Here are four sketch graphs.



Write down the letter of the graph which could represent each relationship.

- (a) y is proportional to the square root of x .

(1)

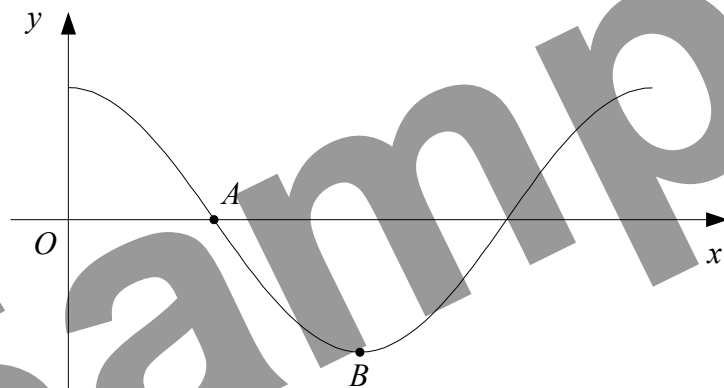
- (b) y is inversely proportional to x .

(1)

13. Simplify $\sqrt{27} + 5\sqrt{12}$ (3)

14. Show that $x^2 - 8x + 19$ can be written in the form $(x + a)^2 + b$ for all values of x . State the value of a and the value of b . (3)

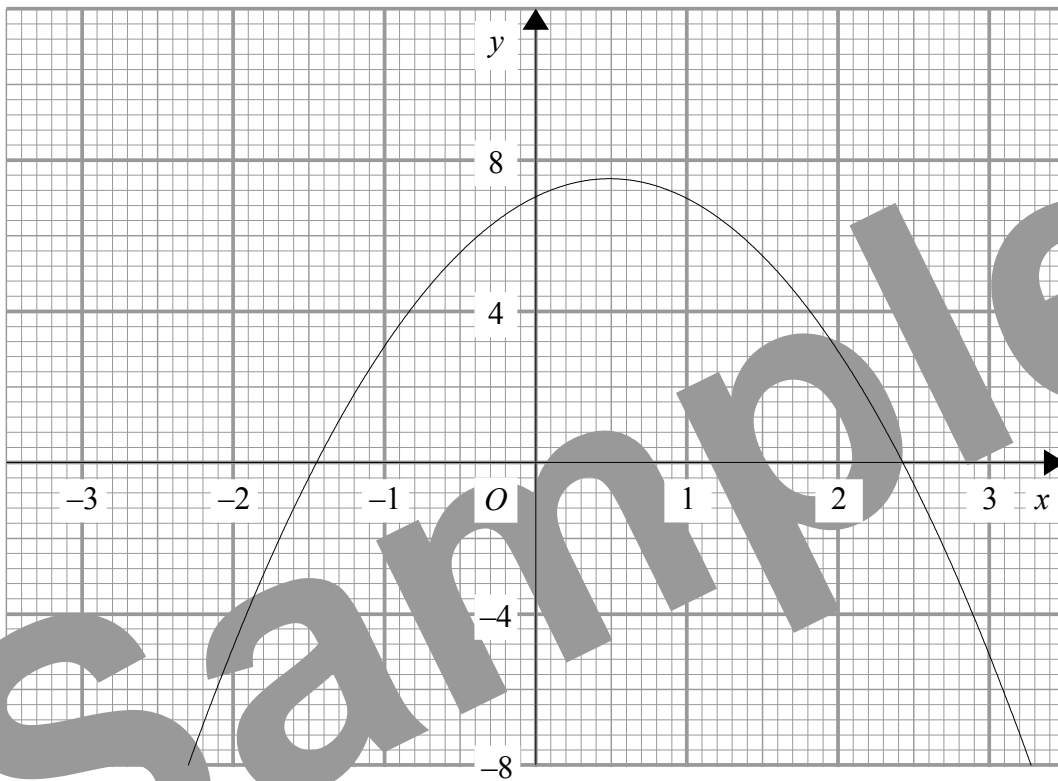
15.



The diagram shows a sketch of part of the graph of $y = \cos x^\circ$.

- (a) Write down the coordinates of
- (i) A ,
 - (ii) B .
- (2)
- (b) On the copy of the diagram above on the answer sheets, sketch the graph of $y = \cos 2x^\circ$. (2)

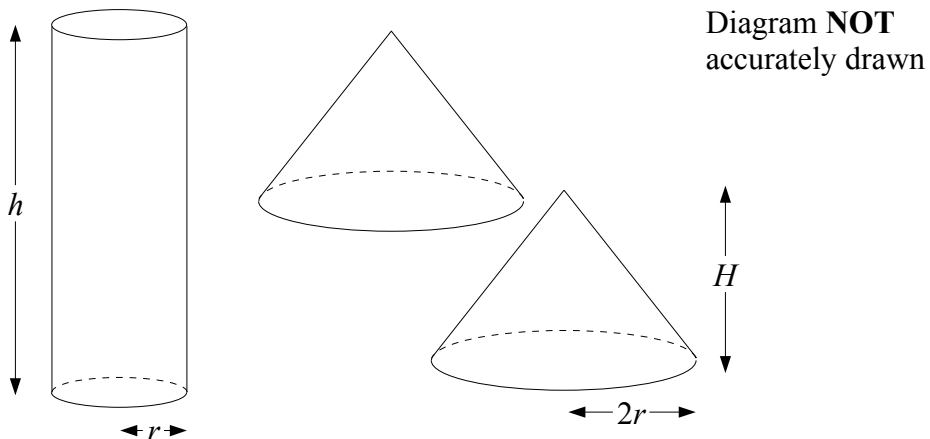
16.



The diagram shows the graph of $y = 7 + 2x - 2x^2$

- (a) Use the graph to estimate the solutions to the equation $7 + 2x - 2x^2 = 0$ (1)
- (b) Explain how, using the graph, you can tell that there are no solutions to the equation $2x - 2x^2 = 1$ (2)

17.



Some plasticine is used to make a solid cylinder of base radius r cm and height h cm. The plasticine is then split in half and used to make two identical cones. Each cone has base radius $2r$ cm and height H cm.

Express H in terms of h . Give your answer in its simplest form.

(4)

END

For Edexcel

Name

Answer Sheets for Higher Tier, Unit 3 Paper A

SECTION A

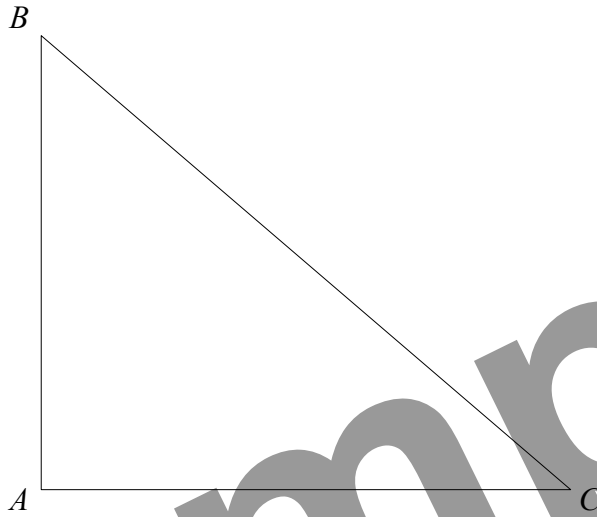
4.

πab	$\frac{a^2 c^2}{d}$	$2\pi b^3$	$abc + d$	$\frac{2d}{b^4}$	$b(c^2 + d^2)$	$c^3 + 2ab$

5. (a)

(b)

9.



15. (b)

