Surname	Centre Number	Candidate Number
Other Names		0

GCSE LINKED PAIR PILOT

4364/02

S16-4364-02

METHODS IN MATHEMATICS

UNIT 2: Methods (Calculator)
HIGHER TIER

A.M. TUESDAY, 14 June 2016

2 hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**3**	
2.	**3**	
3.	**11**	
4.	**10**	
5.	**2**	
6.	**5**	
7.	**7**	
8.	**10**	
9.	**6**	
10.	**6**	
11.	**3**	
12.	**3**	
13.	**5**	
14.	**6**	
15.	**5**	
16.	**6**	
17.	**9**	
Total	**100**	

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ADDITIONAL MATERIALS

A calculator will be required for this paper.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

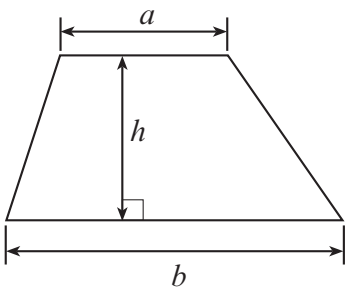
Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

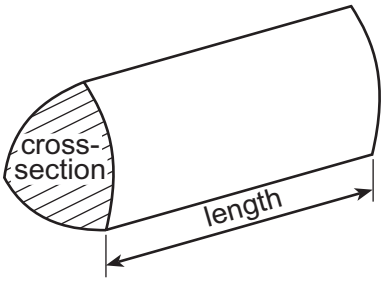
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **8**.

Formula List

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

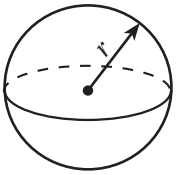


Volume of prism = area of cross-section × length



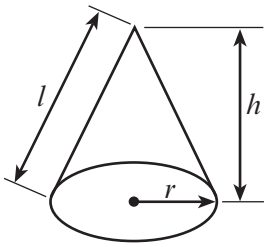
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

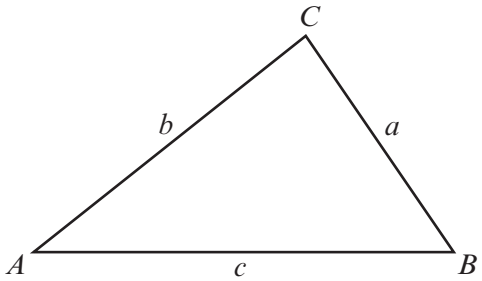


In any triangle ABC

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 = $\frac{1}{2}ab\sin C$



The Quadratic Equation

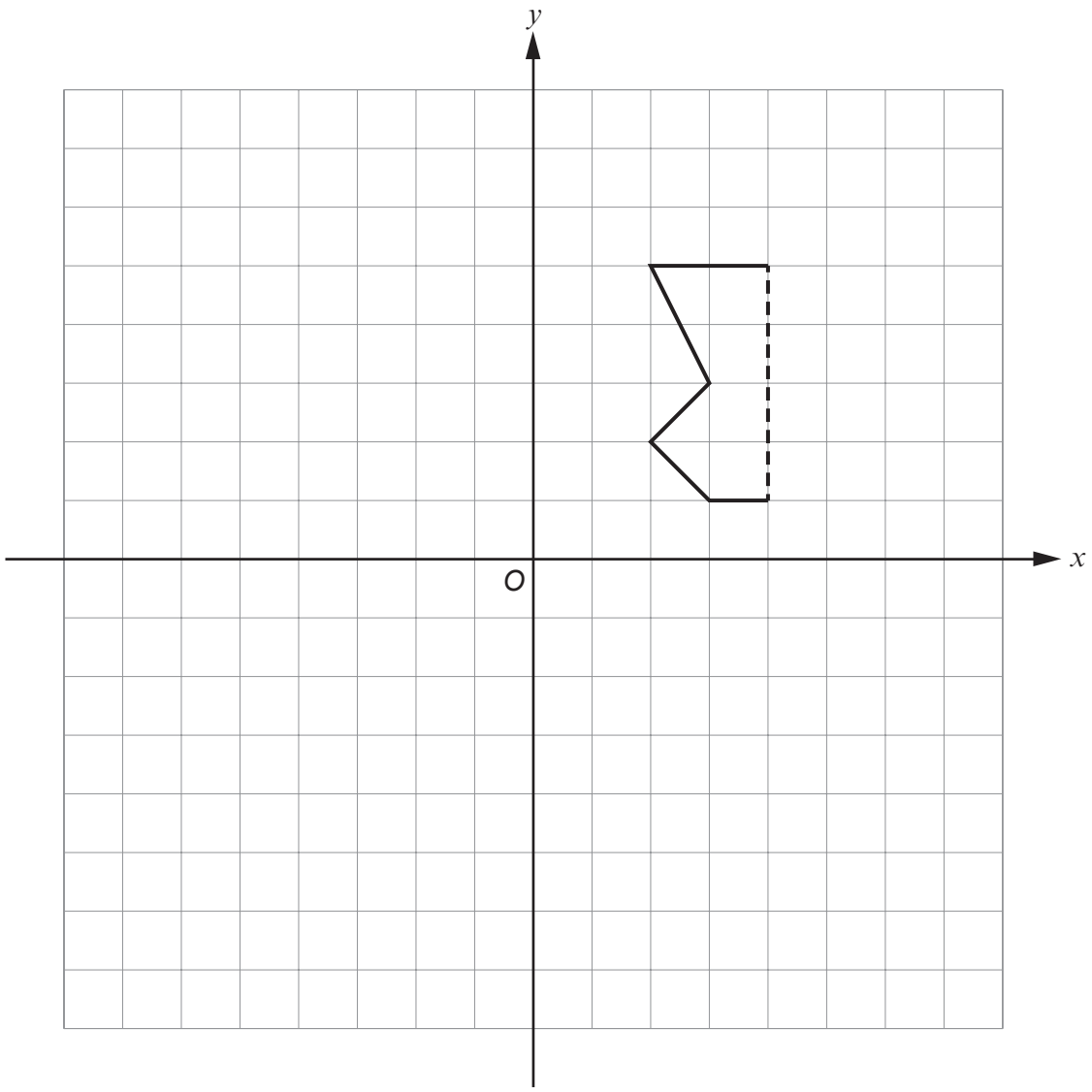
The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

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

Examiner only

1. Part of a shape is shown on the grid.
The dotted line is the line of symmetry of the shape.
Complete the drawing of the shape and then rotate your complete shape through 180° about the origin. [3]



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Turn over.

Examiner only

2. The diagram shows a 6-sided shape.

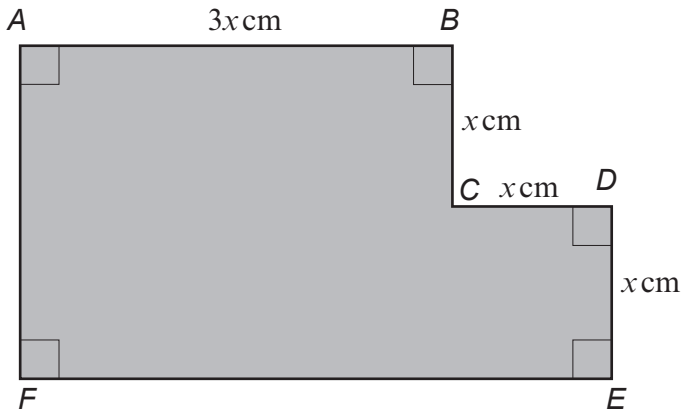


Diagram not drawn to scale

(a) Write down the length of *FE* in terms of x. [1]

.....

.....

(b) The perimeter of the 6-sided shape is 480 cm.
Find the value of x. [2]

.....

.....

.....

.....

.....

.....

Examiner only

3. *(a)* What percentage is 45 of 9000? [2]

.....

.....

(b) Increase 4000 by $1\frac{1}{2}$%. [2]

.....

.....

.....

.....

(c) Evaluate the following three lengths, giving your answers correct to two significant figures. Arrange your answers in ascending order.
You must show all your working. [5]

0·28 of 1350 metres

$\frac{5}{8}$ of 580 metres

8·4% of 4450 metres

.....

.....

.....

.....

.....

Answers:

....
Least Greatest

(d) Calculate the difference between $\frac{1}{3}$ of 30 and $\frac{3}{10}$ of 30. [2]

.....

.....

.....

Examiner only

4. *(a)* Solve $\frac{3x}{8} = 12$. [2]

(b) Solve $\frac{72}{x} = 9$. [1]

(c) Solve $5(7x - 13) = 40$. [3]

(d) Solve the inequality $6x + 4 < 100$. [2]

(e) Write down the greatest whole number that satisfies the inequality $3x < 81$. [2]

5. The circumference of a circle is 24π cm.
Calculate the radius of the circle. [2]

Radius is ..... cm

Examiner only

6.

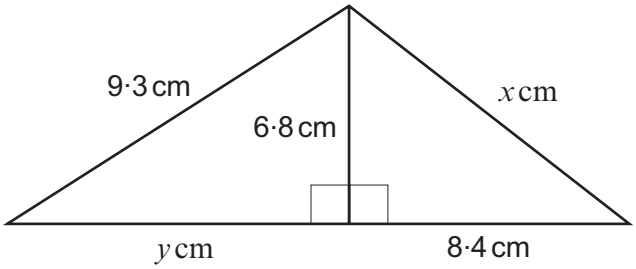


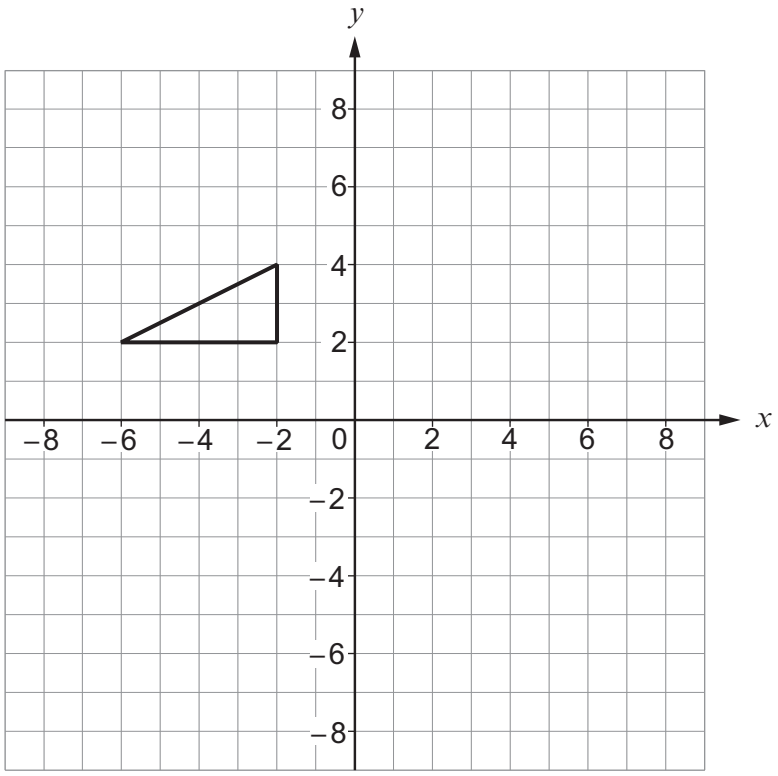
Diagram not drawn to scale

Calculate x and y.
You must show all your working. [5]

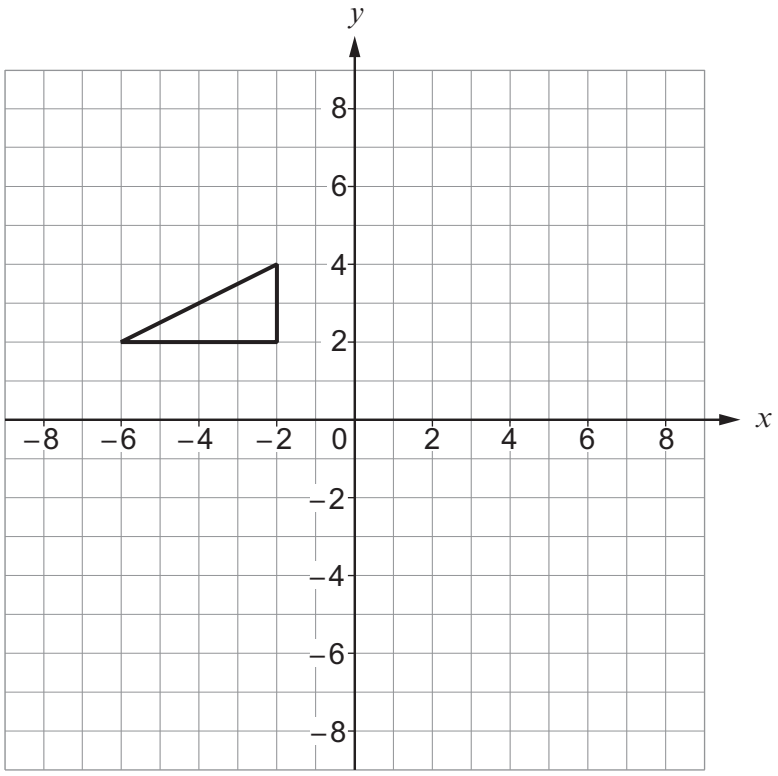
x = ... cm y = ... cm

Examiner only

7. *(a)* Rotate the triangle through 90° clockwise using the point (2, 0) as the centre of the rotation. [2]

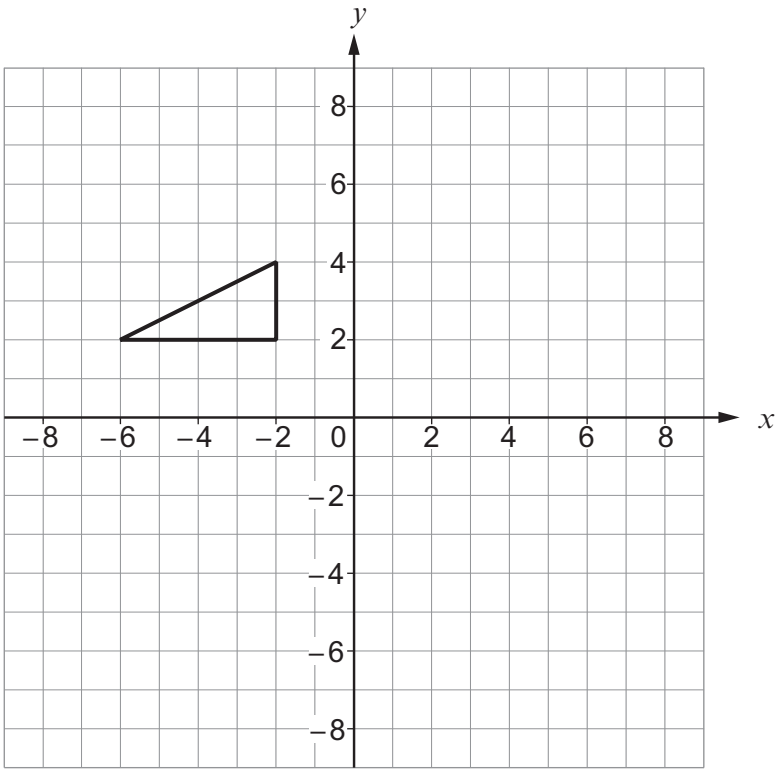


(b) Reflect the triangle shown in the line $y = x$. [2]



Examiner only

(c) Enlarge the triangle shown by a scale factor of $\frac{1}{2}$ using the origin as the centre of the enlargement. [3]



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Examiner only

8. *You will be assessed on the quality of your written communication in this question.*

A square-based cuboid has a height of 15 cm.
It has a volume of 576·6 cm^3.

Each of the lengths of the **sides of the base** of this cuboid is increased by $\frac{1}{5}$.

Calculate the percentage increase in the volume of the cuboid.
You must show all your working. [10]

Examiner only

9. *(a)*

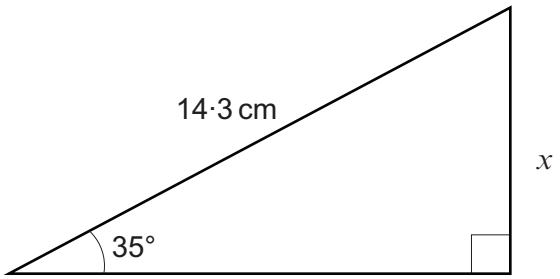

Diagram not drawn to scale

Calculate the length x. [3]

(b)

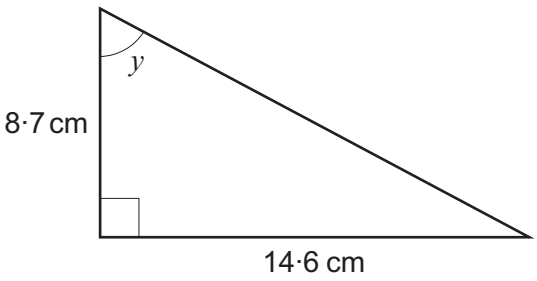

Diagram not drawn to scale

Calculate the size of angle y. [3]

Examiner only

10. An antique clock is valued every 10 years.
The clock was valued at £800 in 1960.
The owner of the clock keeps a record in a table.
An incomplete section of his table is shown below.

Complete the table in the following order:

- For 1980, calculate the difference and percentage difference.
- Calculate the value of the clock in 2000.
- Complete all the remaining boxes in the table. [6]

Year	Value	Difference in value since previous valuation	Percentage difference in value since previous valuation (correct to 1 decimal place)
1970	£750	–£50	–6·3%
1980	£782	£ …..	….. %
1990	£800	+£18	+2·3%
2000	£ …..	£ …..	….. %
2010	£981	£ …..	+9·0%

Examiner only

11. Evaluate the following.
Give your answer in standard form correct to 3 significant figures. [3]

$$\frac{3{\cdot}2\times10^4+7{\cdot}3\times10^5}{6{\cdot}2\times10^3}$$

12.

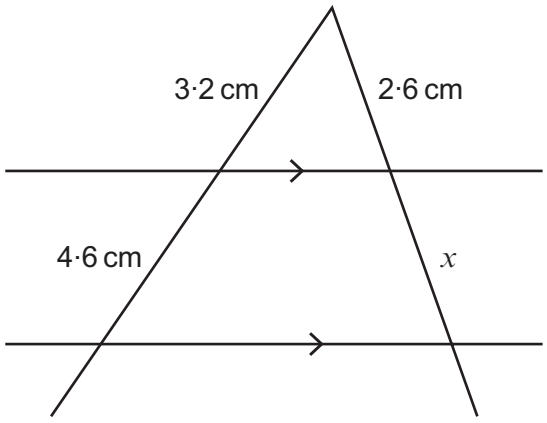

Diagram not drawn to scale

Calculate the length x.
You must show all your working. [3]

x = ... cm

Examiner only

13. The diagram shows two mathematically similar moneyboxes.

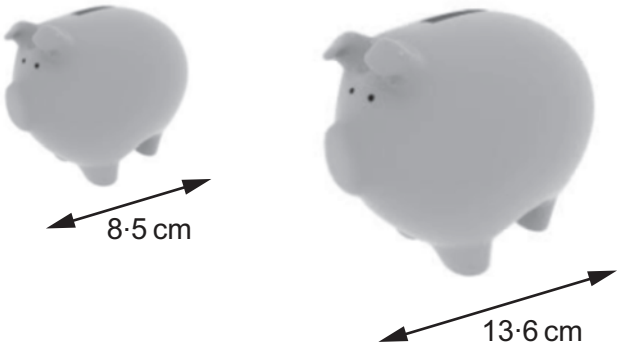

Diagram not drawn to scale

(a) The height of the smaller moneybox is 3 cm.
Calculate the height of the larger moneybox. [2]

Height of the larger moneybox is ..... cm

(b) The volume of the larger moneybox is 102·4 cm^3.
Calculate the volume of the smaller moneybox. [3]

Volume of the smaller moneybox is ..... cm^3

Examiner only

14. Solve the following simultaneous equations using an algebraic method. [6]

$$2x^2 + xy + 6 = 0$$
$$x + y = 7$$

Examiner only

15. Given that y is inversely proportional to x^2, and that $y = 10$ when $x = 6$, find the values of x when $y = 4$. [5]

Examiner only

16. The diagram shows two sectors of circles, *BOC* and *AOD*.
The circles have a common centre, *O*.
You are given that $A\hat{O}D$ = 131°, *OB* = *OC* = 8·4cm and *BA*:*AO* is 1:2.

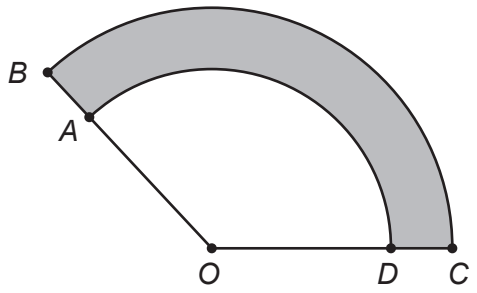

Diagram not drawn to scale

Calculate the perimeter of the shaded region *ABCD*. [6]

Perimeter of *ABCD* is ..... cm

Examiner only

17.

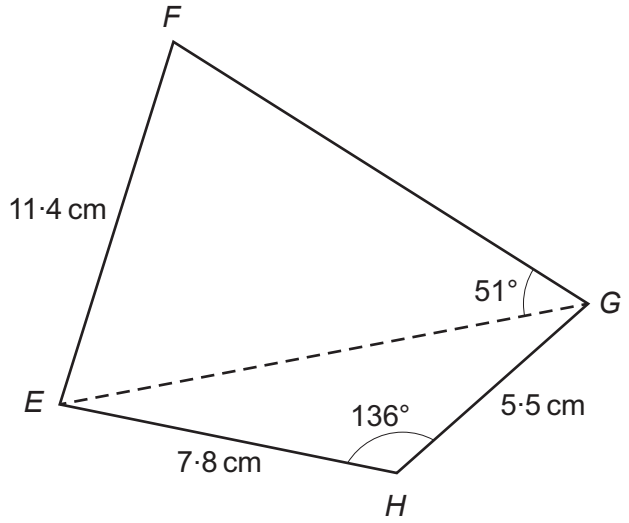

Diagram not drawn to scale

Calculate the area of *EFGH*. [9]

Examiner only

END OF PAPER