

Centre No.						Paper Reference						Surname	Initial(s)		
Candidate No.						5	3	8	4	H	/	1	3	H	Signature

Paper Reference(s)

**5384H/13H**

**Edexcel GCSE**

**Mathematics (Modular) – 2381**

**Paper 13 (Non-Calculator)**

**Higher Tier**

**Unit 3**

**Thursday 5 November 2009 – Morning**

**Time: 1 hour 10 minutes**

Examiner's use only

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Team Leader's use only

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**Materials required for examination**

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

**Items included with question papers**

Nil

**Instructions to Candidates**

In the boxes above, write your centre number, candidate number, your surname, initials and signature.

Check that you have the correct question paper.

Answer ALL the questions. Write your answers in the spaces provided in this question paper.

**You must NOT write on the formulae page.**

**Anything you write on the formulae page will gain NO credit.**

If you need more space to complete your answer to any question, use additional answer sheets.

**Information for Candidates**

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2).

There are 18 questions in this question paper. The total mark for this paper is 60.

There are 16 pages in this question paper. Any blank pages are indicated.

**Calculators must not be used.**

**Advice to Candidates**

Show all stages in any calculations.

Work steadily through the paper. Do not spend too long on one question.

If you cannot answer a question, leave it and attempt the next one.

Return at the end to those you have left out.

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**Turn over**

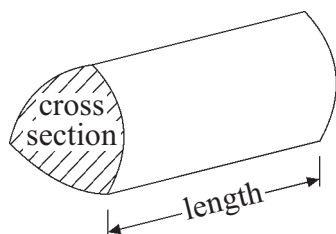
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## GCSE Mathematics 2381

### Formulae: Higher Tier

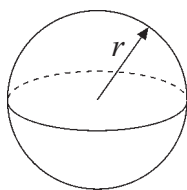
**You must not write on this formulae page.**  
**Anything you write on this formulae page will gain NO credit.**

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



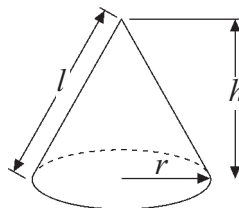
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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

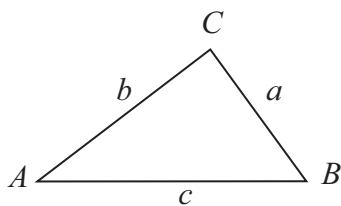


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

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



**In any triangle ABC**



**The Quadratic Equation**

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

where  $a \neq 0$ , are given by

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

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



**Answer ALL EIGHTEEN questions.**

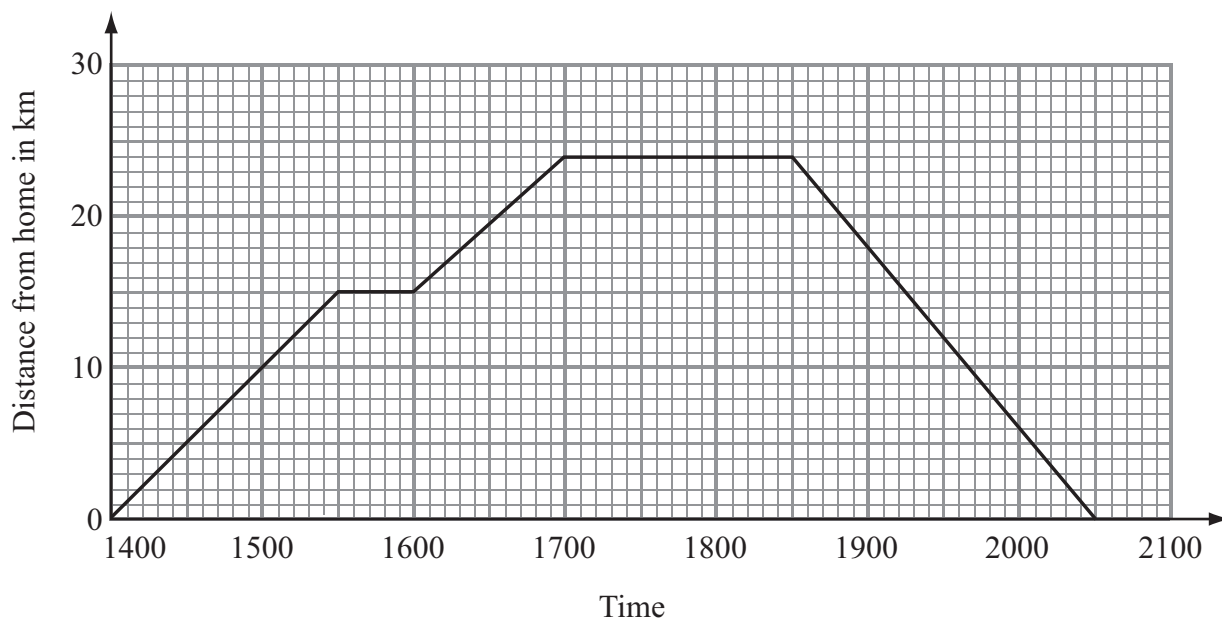
**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**You must NOT use a calculator.**

1. Jenny cycled from home to visit her uncle.

She had a rest on the way to her uncle's house.  
The travel graph shows her journey.



- (a) How far is Jenny's uncle's house from Jenny's home?

..... km  
(1)

- (b) How long did Jenny stay at her uncle's house?

.....  
(1)

**(Total 2 marks)**

**Q1**



2. (a) Work out 25% of 800

.....  
(1)

(b) Write 52 out of 200 as a percentage.

..... %  
(2)

(Total 3 marks)

Q2

3. The ratio of pink tiles to white tiles on a bathroom floor is 1:4  
There are 6 pink tiles.

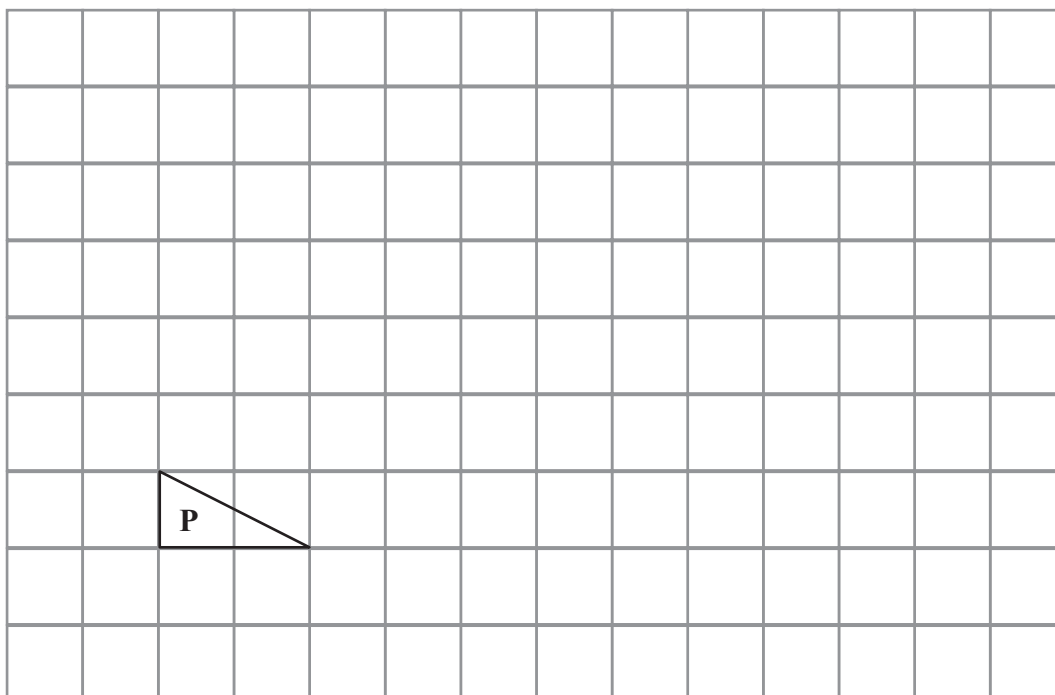
Work out the number of white tiles.

.....  
(Total 2 marks)

Q3



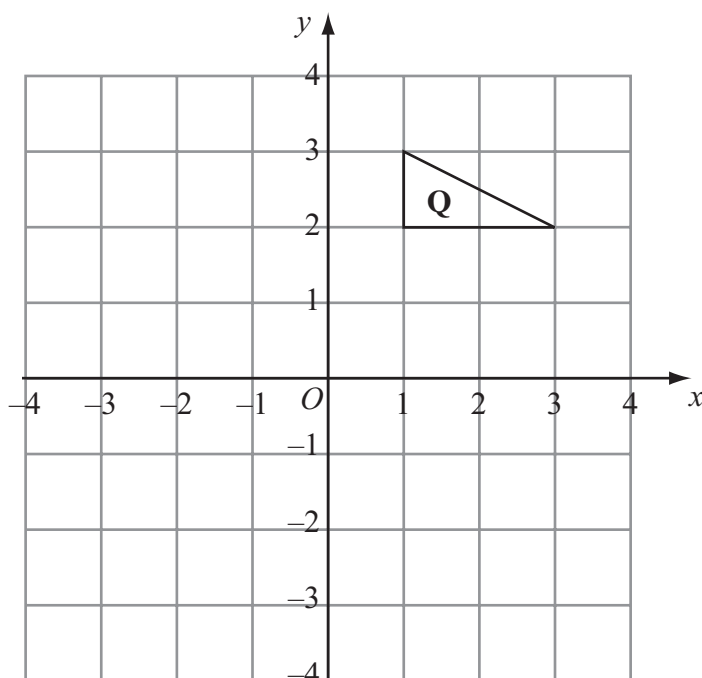
4.



Triangle **P** has been drawn on a grid.

(a) On the grid, draw an enlargement of the triangle **P** with scale factor 3

(2)



Triangle **Q** has been drawn on a grid.

(b) On the grid, rotate triangle **Q**  $90^\circ$  clockwise, centre  $O$ .

(3)

Q4

(Total 5 marks)



5. (a) Solve  $4(x - 3) = 2x + 13$

$x = \dots\dots\dots$   
(3)

(b)  $k$  is an integer such that  $-1 \leq k < 3$

List all the possible values of  $k$ .

$\dots\dots\dots$   
(2)

(c) Solve the inequality  $6y \geq y + 10$

$\dots\dots\dots$   
(2)

(Total 7 marks)

Q5



6. (a) A solid cube has sides of length 5 cm.

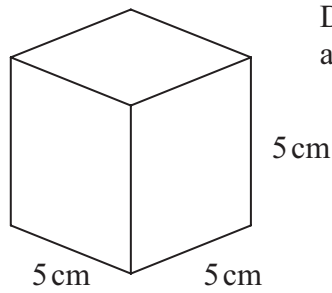


Diagram **NOT**  
accurately drawn

Work out the total surface area of the cube.  
State the units of your answer.

.....  
(4)

The volume of the cube is  $125 \text{ cm}^3$ .

- (b) Change  $125 \text{ cm}^3$  into  $\text{mm}^3$ .

.....  $\text{mm}^3$   
(2)

(Total 6 marks)

Q6



7. (a) Work out  $\frac{3}{8} + \frac{1}{4}$

Give your answer in its simplest form.

.....  
(2)

(b) Work out  $\frac{2}{3} \times \frac{4}{5}$

.....  
(2)

(Total 4 marks)

Q7



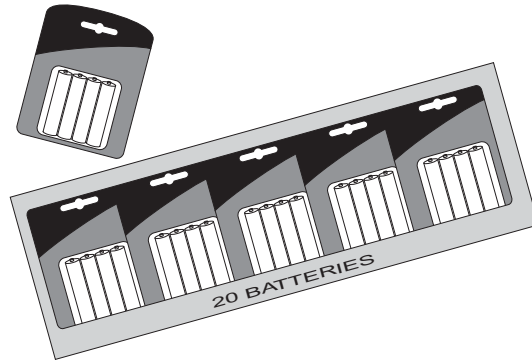


8. Batteries are sold in packets and boxes.

Each packet contains 4 batteries.  
Each box contains 20 batteries.

Bill buys  $p$  packets of batteries  
and  $b$  boxes of batteries.  
Bill buys a total of  $N$  batteries.

Write down a formula for  $N$   
in terms of  $p$  and  $b$ .



.....

(Total 3 marks)

Q8

9. Make  $q$  the subject of the formula  $5(q + p) = 4 + 8p$   
Give your answer in its simplest form.

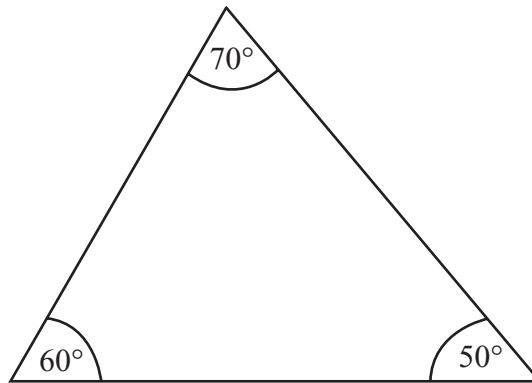
$q =$  .....

(Total 3 marks)

Q9



10. (a) Here is a triangle.



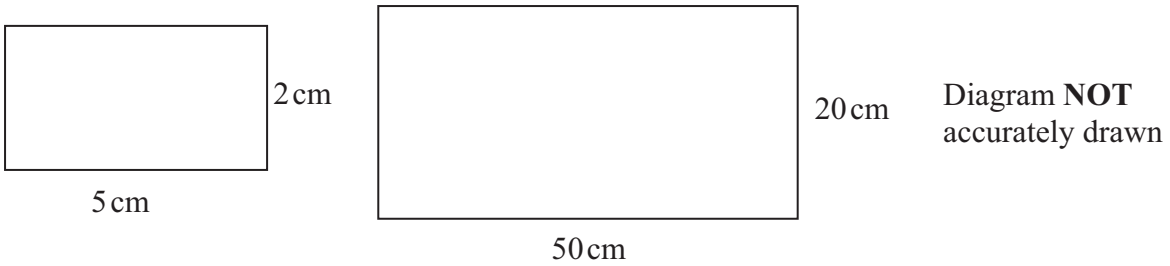
This triangle is to be enlarged by a scale factor of 2

Emily says the angles will be doubled.

Emily is **wrong**.  
Explain why.

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

(b) Here are two rectangles.



Ross says that the larger rectangle is an enlargement of the smaller rectangle.

Ross is **correct**.  
Explain why.

.....  
.....  
(2)

(Total 3 marks)

Q10



11.

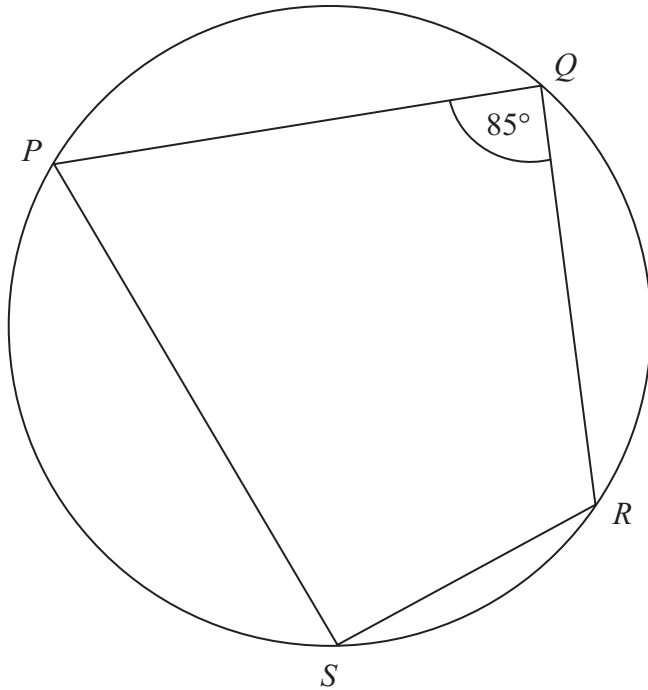


Diagram **NOT**  
accurately drawn

$P$ ,  $Q$ ,  $R$  and  $S$  are points on the circumference of a circle.  
Angle  $PQR = 85^\circ$ .

Find the size of angle  $PSR$ .

Give a reason for your answer.

.....<sup>o</sup>

(Total 2 marks)

Q11



12. Solve the simultaneous equations

$$4x + y = -1$$

$$4x - 3y = 7$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

(Total 3 marks)

Q12

13. Work out  $\frac{5 \times 10^8}{2 \times 10^{15}}$

Give your answer in standard form.

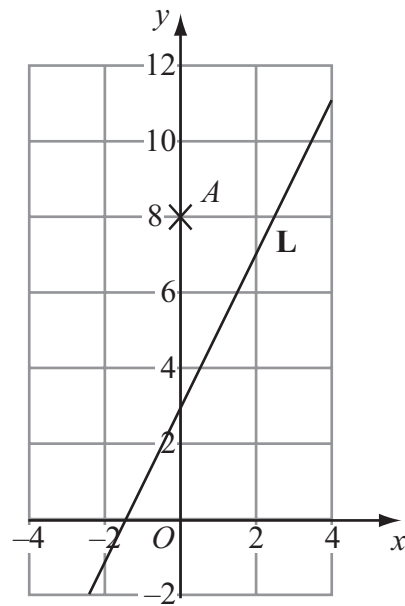
$$\dots\dots\dots$$

(Total 2 marks)

Q13



14.



$A$  is the point  $(0, 8)$ .

$L$  is the line with equation  $y = 2x + 3$

Find the equation of the line passing through  $A$ , that is also perpendicular to  $L$ .

.....

(Total 3 marks)

Q14



15. (a) Work out  $(9^{\frac{1}{2}})^4$

.....  
(1)

$$y^3 = 11$$

$y$  can be written in the form  $11^a$

(b) Write down the value of  $a$ .

$a =$  .....  
(1)

(Total 2 marks)

Q15

16. Work out  $(2 + \sqrt{3})(2 - \sqrt{3})$

Give your answer in its simplest form.

.....

(Total 2 marks)

Q16



17.

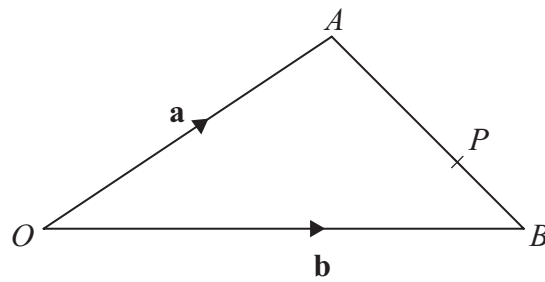


Diagram **NOT**  
accurately drawn

$OAB$  is a triangle.

$$\vec{OA} = \mathbf{a}, \quad \vec{OB} = \mathbf{b}$$

- (a) Find the vector  $\vec{AB}$  in terms of **a** and **b**.

$$\vec{AB} = \dots\dots\dots (1)$$

$P$  is the point on  $AB$  so that  $AP : PB = 2 : 1$

- (b) Find the vector  $\vec{OP}$  in terms of **a** and **b**.  
Give your answer in its simplest form.

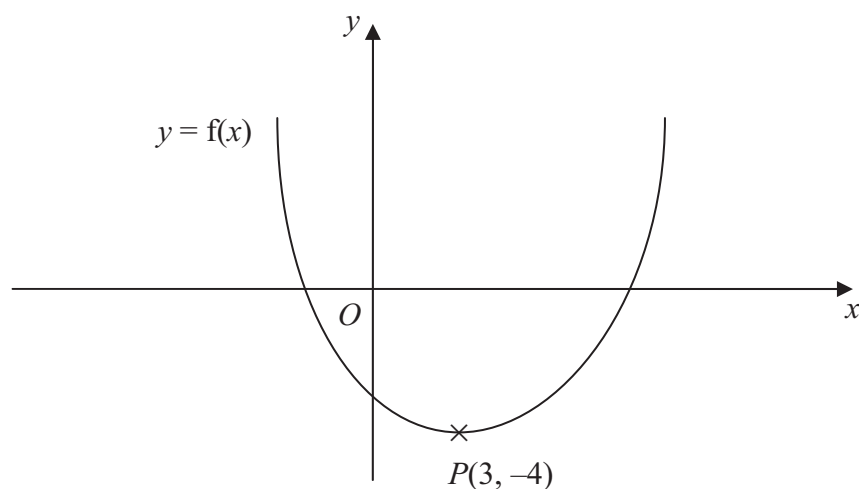
$$\vec{OP} = \dots\dots\dots (3)$$

(Total 4 marks)

Q17



18. This is a sketch of the curve with the equation  $y = f(x)$ .  
The only minimum point of the curve is at  $P(3, -4)$ .



- (a) Write down the coordinates of the minimum point of the curve with the equation  $y = f(x - 2)$

(..... , .....)  
(2)

- (b) Write down the coordinates of the minimum point of the curve with the equation  $y = f(x + 5) + 6$

(..... , .....)  
(2)

Q18

(Total 4 marks)

**TOTAL FOR PAPER: 60 MARKS**

**END**

