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NAME:

DATE:

SCHOOL:

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# ST EDWARD'S, OXFORD

Department of Mathematics



13+ Entrance Exam

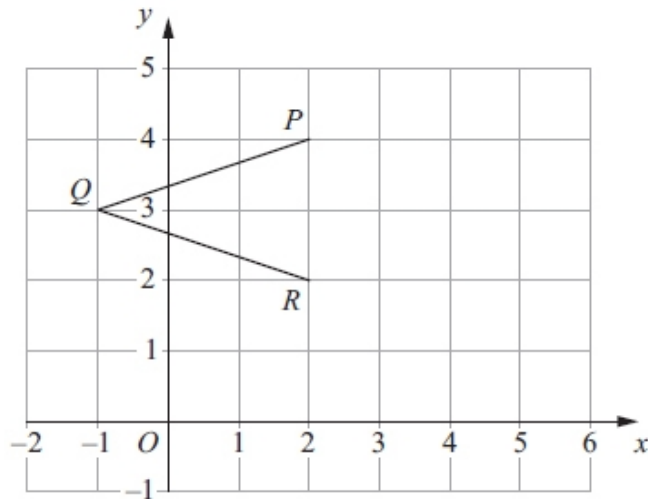
For Entry in September 2018

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## Instructions

- 70 Marks
  - 1 Hour
  - Calculators are NOT allowed
-

**Q1.** The diagram shows three points  $P$ ,  $Q$  and  $R$  on a 1 cm grid.



(a) Write down the coordinates of  $P$ .

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

(b) Write down the coordinates of  $Q$ .

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

(c) On the grid, mark the point  $S$  so that  $PQRS$  is a rhombus.

(1)

(d) Work out the area of the rhombus  $PQRS$ .

.....  $\text{cm}^2$   
(2)

(e) Write down the equation of the line  $PR$ .

.....  
(1)

**(Total for question = 6 marks)**

**Q2.**

(a) Write 64% as a fraction.  
Give your fraction in its simplest form.

.....  
(2)

(b) Write 9% as a decimal.

.....  
(1)

(c) Work  $\frac{1}{6}$  out of 84 kg.

..... kg  
(1)

**(Total for question = 4 marks)**

**Q3.** Nikos buys  
4 cans of cola at 1.25 euros each  
and 2 sandwiches at 2.90 euros each.

He pays with a 20 euro note.

Work out how much change Nikos should get.

..... euros

**(Total for question = 3 marks)**

**Q4.**

(a) Show that

$$\frac{4}{5} + \frac{2}{3} = 1\frac{7}{15}$$

(2)

(b) Show that

$$2\frac{1}{4} \div 3\frac{1}{2} = \frac{9}{14}$$

(3)

**(Total for Question is 5 marks)**

**Q5.** Which of the following expressions gives the largest number?

**A**  $1 \times 9 + 9 \times 7$

**B**  $1 + 9 + 9 + 7$

**C**  $1 \times 9 + 9 + 7$

**D**  $1 + 9 \times 9 + 7$

**E**  $1 + 9 + 9 \times 7$

.....  
**(Total for Question is 2 marks)**

**Q6.**

(a) Simplify  $8d \times 7d$

.....  
(1)

(b) Expand  $4(3e - 5)$

.....  
(1)

(c) Factorise  $f^2 - 2f$

.....  
(2)

(d)  $H = g^3 + 6g$

Work out the value of  $H$  when  $g = 2$

$H =$  .....  
(2)

**(Total for Question is 6 marks)**

**Q7.**

(a) Expand and simplify fully  $4(2y + 3) + 2(y - 6)$

.....  
(2)

(b) Solve  $7x - 5 = 5x - 4$   
Show clear algebraic working.

$x =$  .....  
(3)

(c) Expand and simplify  $(x - 3)(x + 7)$

.....  
(2)

**(Total for Question is 7 marks)**

**Q8.** The mean of four numbers is 2.6  
One of the four numbers is 5

Find the mean of the other three numbers.

.....

**(Total for Question is 3 marks)**

**Q9.** The diagram shows a shape with one line of symmetry.

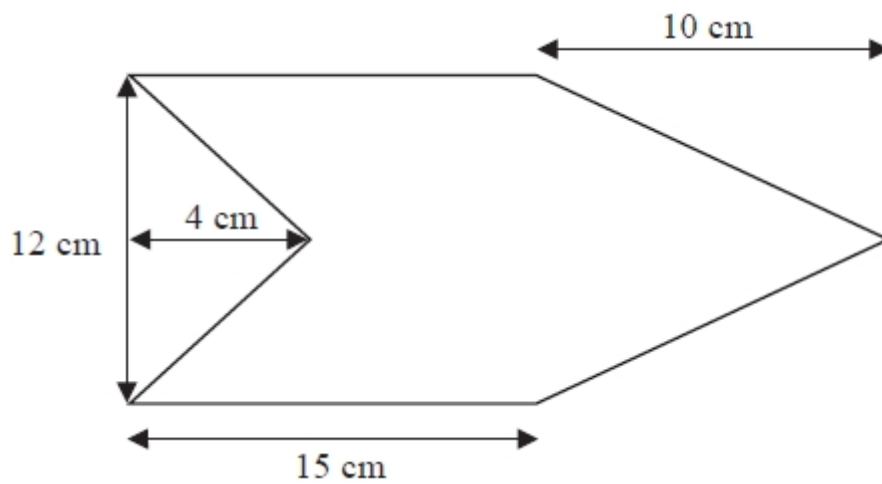


Diagram NOT  
accurately drawn

Work out the area of the shape.

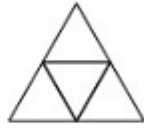
..... cm<sup>2</sup>

(Total for question = 4 marks)

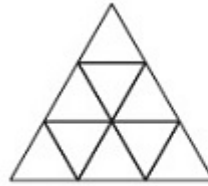
**Q10.** Here is a sequence of patterns made from small triangular tiles.



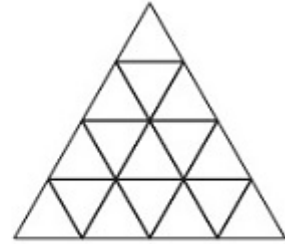
Pattern number 1



Pattern number 2



Pattern number 3



Pattern number 4

The table shows the number of tiles used to make each pattern.

<b>Pattern number</b>	1	2	3	4
<b>Number of tiles</b>	1	4	9	16

(a) How many tiles are used to make

(i) Pattern number 5

.....

(ii) Pattern number 10

.....

(2)

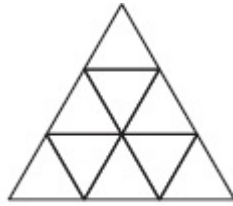
A pattern in the sequence is made from 144 tiles.

(b) Find the Pattern number for this pattern.

.....

(1)

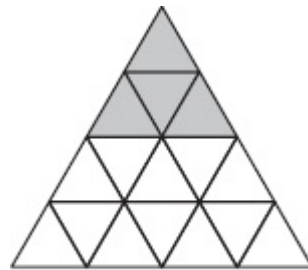
(c) On the diagram below, shade  $\frac{2}{3}$  of Pattern number 3.



Pattern number 3

(1)

Some tiles in Pattern number 4 are shaded.



Pattern number 4

(d) What fraction of Pattern number 4 is shaded?

Give your fraction in its simplest form.

.....  
(2)

**(Total for Question is 6 marks)**

**Q9.**

A school has 840 pupils and 40 teachers.

(a) Find the ratio of the number of pupils to the number of teachers.  
Give your ratio in the form  $n : 1$

..... : 1  
(2)

In Year 11 at the school, the ratio of the number of pupils who study Chemistry to the number of pupils who study Physics is 3 : 2

(b) 105 pupils in Year 11 study Chemistry.  
Work out the number of pupils in Year 11 who study Physics.

.....  
(2)

For the 105 pupils who study Chemistry, the ratio of the number of boys to the number of girls is 4 : 3

(c) Work out the number of girls in Year 11 who study Chemistry.

.....  
(2)

**(Total for Question is 6 marks)**



**Q11.**

Kim bought 12 boxes of drinks.

He paid \$15 for each box.

There were 12 drinks in each box.

Kim sold  $\frac{3}{4}$  of the drinks for \$1.50 each.

He sold all of the other drinks at a reduced price.

He made an overall profit of 15%.

Work out how much Kim sold each reduced price drink for.

\$ .....

**(Total for Question is 5 marks)**

**Q12.** The diagram shows a right-angled triangle and a rectangle.

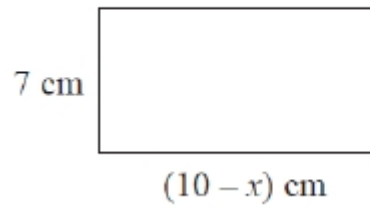
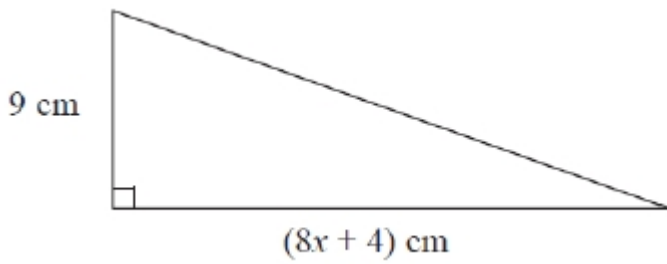


Diagram **NOT** accurately drawn

The area of the triangle is twice the area of the rectangle.

(i) Write down an equation for  $x$ .

.....  
(ii) Find the area of the rectangle.

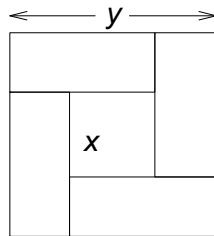
Show clear algebraic working.

.....  $\text{cm}^2$

**(Total for question = 7 marks)**

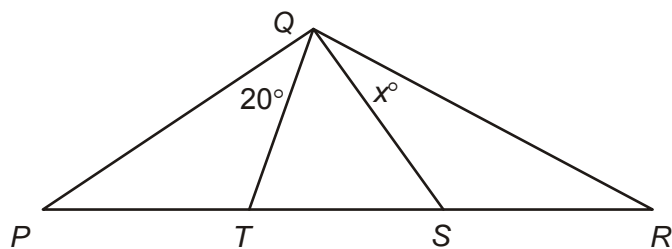
**Q13.** The diagram shows a square with sides of length  $y$  divided into a square with sides of length  $x$  and four congruent rectangles.

What is the length of the longer side of each rectangle, give your answer as an expression of  $x$  and  $y$ ?



**Q14.** In the diagram below,  $PT = QT = TS$ ,  $QS = SR$ ,  $\angle PQT = 20^\circ$ .  
What is the value of  $x$ ?

.....  
(Total for question = 3 marks)



.....  
(Total for question = 3 marks)