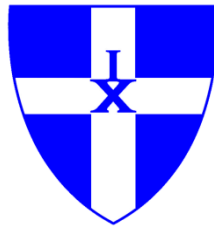


**The King's School, Canterbury**

**Entrance Examinations (13+)**

**2012-13**



**Mathematics**

**One Hour**

*Answer as many questions as possible, presenting your answers clearly and neatly and showing all relevant working in the correct spaces on the paper.*

*Calculators may be used in any question unless stated otherwise. In a question where a calculator is prohibited, your working must display sufficient detail to show that it has not been used.*

*If you cannot do a question, leave it and go on to the next. You need to work fast to get to the end of the paper. There are 90 marks in total.*

**NAME:** ..... **AGE:** .....

**PRESENT SCHOOL:** .....

<b>Total:</b>	<b>%</b>
---------------	----------

1. Write these numbers in order of size, from smallest to largest.

$$\frac{1}{120}, 8 \times 10^{-2}, 8.4\%, 0.0788, \frac{8}{1000}$$

.....  
**(Total 3 marks)**

2. There are 800 pupils in a school. There are 375 girls.

$\frac{3}{5}$  of the girls own an iPad.

$\frac{4}{5}$  of the boys own an iPad.

Work out the total number of pupils in the school who own an iPad.

.....  
**(Total 3 marks)**

3. Simplify

(i)  $8x - 13x$

(ii)  $q \times 7 \times p$

(iii)  $p^3 \times p^5$

.....  
**(Total 3 marks)**

4. 1 kilogram is approximately equivalent to 2.2 lb (pounds). If Alan weighs 210lb and Bob weighs 95 kilos, who is heavier? Show full working in order to explain your answer.

.....  
(Total 4 marks)

5. Given that

$$s = ut + \frac{1}{2}at^2$$

find  $s$  when  $u = 17, a = 4.9, t = 12$

.....  
(Total 3 marks)

6. In this question you **MUST** use your calculator and you **MAY** write down any stage in your calculation.

Evaluate:

$$\frac{42.7^3 - 133.2 \times 9.44}{0.003 \times 678.5}$$

.....  
(Total 3 marks)

7. I make a drink with tomato juice and beetroot juice in the ratio 2:9. How much beetroot juice do I use to make 550 ml of this drink?

.....  
**(Total 3 marks)**

8. (a) Solve  $7x + 18 = 53$

$x =$  .....  
**(2)**

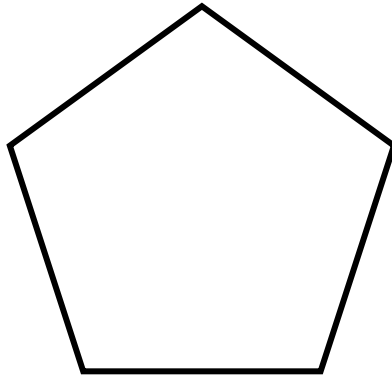
(b) Solve  $6(2y - 5) = 42$

$y =$  .....  
**(2)**

(c) Solve  $3p + 7 = 3(4 - p)$

$p =$  .....  
**(3)**  
**(Total 7 marks)**

9.



(a) Work out the size of one of the **exterior** angles of the **regular** pentagon above, showing your working/reasoning.

.....  
(2)

(b) Work out the size of one of the **interior** angles of the pentagon, showing your working/reasoning.

.....  
(2)  
(Total 4 marks)

10. Work out  
number.

$$3\frac{1}{4} + 2\frac{5}{6}$$

**WITHOUT A CALCULATOR.** Give your answer as a **mixed**

.....  
(Total 4 marks)

11. (a) A few years ago I bought a painting for £625. I recently sold it for £1275. What percentage profit is that?

.....  
(3)

(b) I had to pay  $12\frac{1}{2}\%$  of the sale price as commission. How much was that?

.....  
(2)

(c) I sold some another painting for £480, which gave me a loss of 4%. What had I originally bought it for?

..... (3)  
(Total 8 marks)

12.

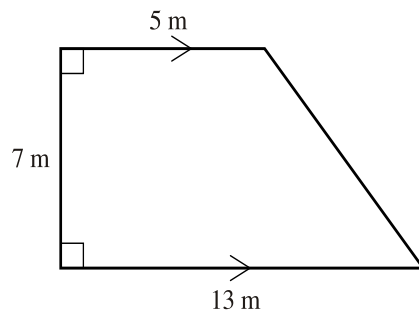


Diagram **NOT** accurately drawn.

Work out the area of the shape.

..... m<sup>2</sup>  
(Total 3 marks)

13. Daniel leaves his house at 07 00.

He drives 87 miles to work.

He drives at an average speed of 36 miles per hour.

At what time does Daniel arrive at work?

.....  
**(Total 3 marks)**

14. Mr A and Mr B play a dice game where they each throw two dice. The score of each die is taken to be negative if odd and positive if even. So, if Mr A rolls a 5 and a 2 then he scores  $-5 + 2 = -3$ .

(a) Calculate the total scores after three rounds for (i) Mr A and (ii) Mr B given the information below:

	Mr A throws	Mr B throws
Round 1	4 and 3	5 and 2
Round 2	6 and 1	2 and 3
Round 3	1 and 1	2 and 5

Mr A scores.....

Mr B scores.....

**(3)**

(b) Who wins if the aim is to achieve the lowest score?

.....**(1)**  
**(Total 4 marks)**

15. Write down each of the following numbers correct to the specified degree of accuracy:

(a) 123134 to 2 significant figures

.....  
(2)

(b) 3.1415926 to 3 decimal places

.....  
(2)

(c) 0.899543 to 3 significant figures

.....  
(2)

**(Total 6 marks)**

16. (a) Factorise  $3t - 12$

.....  
(1)

(b) Expand and simplify  $3(2x - 1) - 3(2x - 3)$

.....  
(2)  
**(Total 3 marks)**



17. Some tests were done on two different types of light bulb, to see whether or not they worked when they were first used. The table shows the results.

Type of bulb	Worked	Did not work
Supa Bulb	990	10
Brighta Bulb	196	4

- (a) Calculate the probability that a Supa Bulb does not work.

.....  
(1)

- (b) Calculate the probability that a Brighta Bulb does not work.

.....  
(1)

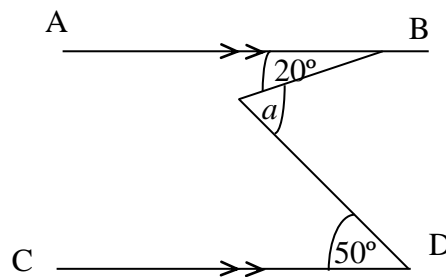
- (c) Which type of bulb is most likely not to work?

.....  
(1)

- (d) 6000 Supa Bulbs are made. Estimate how many will not work.

.....  
(2)  
(Total 5 marks)

18. Line AB and line CD are parallel.



*not to scale*

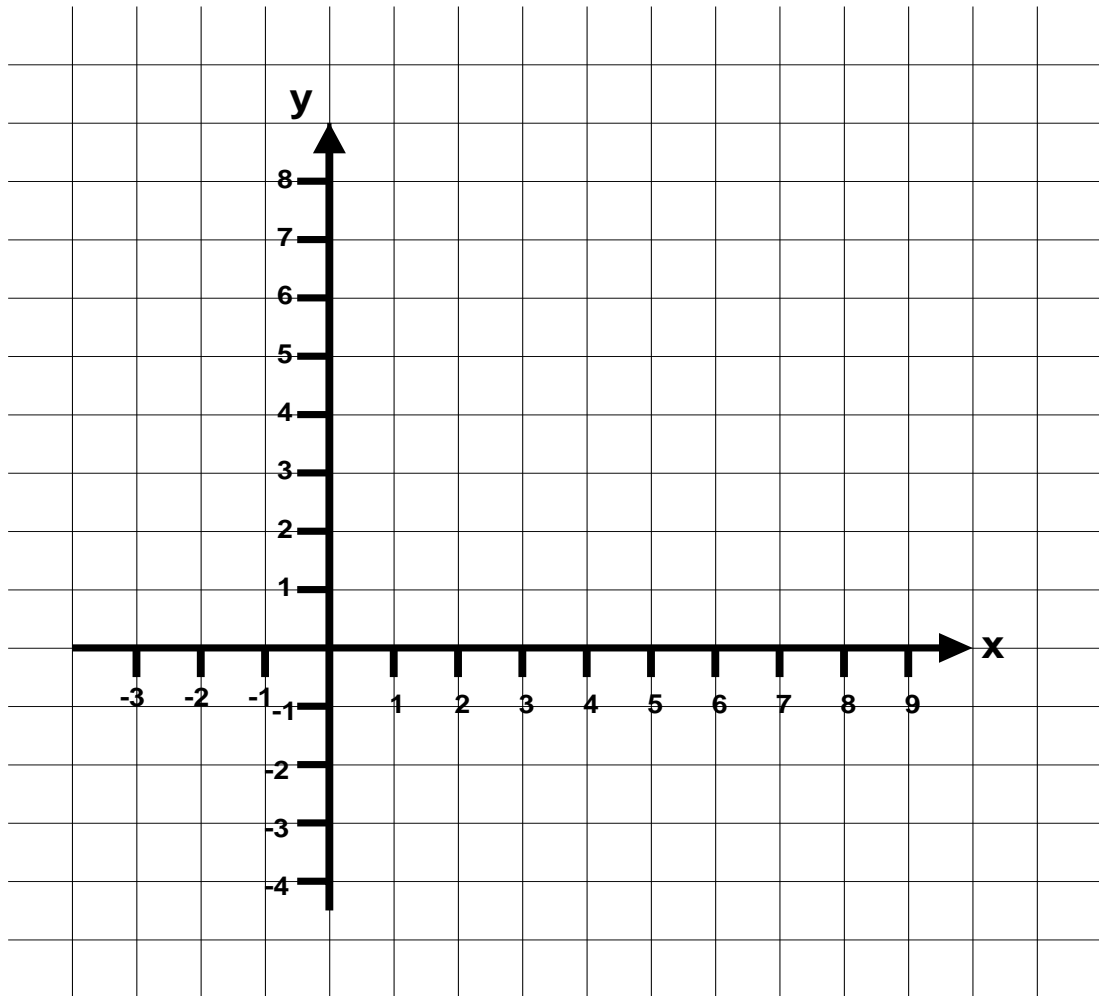
Calculate the value of  $a$ , showing your working and/or reasoning clearly.

.....  
(Total 3 marks)

19. Using the pair of axes given below plot carefully the points

A(1,1) B(6,1) C(9,5) D(4,5)

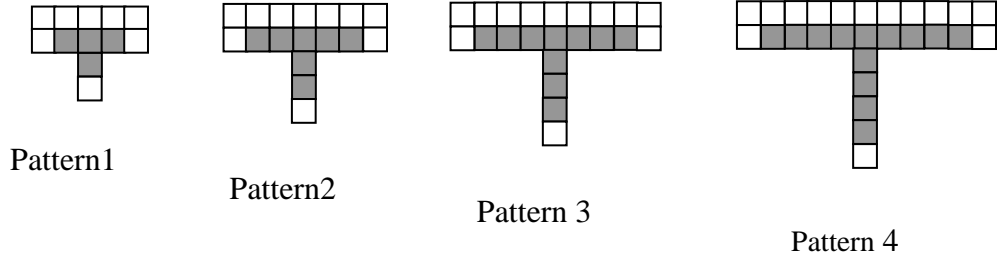
And join them to form the shape ABCD.



What is the best name for the shape you have drawn?

.....  
(Total 5 marks)

20.



The patterns above are made with black and white squares.

(a) Complete this table.

Pattern Number (P)	Number of black squares (B)	Number of white squares (W)
1	4	8
2	7	10
3	10	12
4	13	14
5		
10		
20		

(3)

P = Pattern

B = Black squares

W = White squares

(b) Write down a formula connecting the pattern number (P) and the number of black squares (B).

.....(2)

(c) What is the pattern number which has 70 black squares?

.....(3)

**TURN OVER**

(d) Write down a formula connecting the pattern number (P) and the number of white squares (W).

.....(2)

(e) A pattern has 142 white squares. How many black squares does the pattern have?

.....(3)

**(Total 13 marks)**

**END OF EXAMINATION.  
PLEASE NOW GO BACK AND CHECK YOUR WORK**