Your FIRST name:		Your SURNAME:	

Today's Date:

MILL HILL SCHOOL

Remove (14+) Entrance Examinations 2014

MATHEMATICS

Time allowed: 1 hour

Instructions to candidates

- Write your answers and working on this question paper.

- Show all of your working clearly.

- If you do not show sufficient working you may not get full credit for your answers.

- You are expected to use an electronic calculator where appropriate.

1. Write these numbers in standard form:

a) 123400 .... **(1)**

b) 0.0001234 .... **(1)**

Write these numbers to 2 significant figures:

c) 12340 .... **(1)**

d) 0.001234 .... **(1)**

Write this number to 2 decimal places:

e) 0.01234 .... **(1)**

(Total 5 marks)

2. Hamish walks at an average speed of $2\frac{1}{2}$ miles per hour. How long will it take him to walk 16 miles? Give your answer in hours and minutes.

....

(Total 4 marks)

3. A cake mixture uses sugar and flour in the ratio of 3:8.

a) If I use 9oz of sugar how much flour do I need to use?

....

(1)

b) If I use 27.5oz of both flour and sugar together, how much sugar do I use?

....

(2)

(Total 3 marks)

4. The table shows the number of mobile phones sold in a shop in April and in May.

April	May
85	91

Work out the percentage increase in the number of mobile phones sold from April to May.

Give your answer correct to 3 decimal places.

.... %

(Total 2 marks)

5. Solve $7(x + 2) = \dfrac{5x + 1}{2}$

$x =$ ……………..

(Total 4 marks)

6. Remove the brackets from the following expressions and then simplify :-

a) $5 (x + 2) - 3 (x - 2)$

……………..

(2)

b) $(y + 4) (y - 2)$

……………..

(3)

(Total 5 marks)

7. a) In a French test the results of ten students were 23, 31, 32, 15, 19, 29, 17, 26, 19 and 27. Calculate the mean of these results.

……………..

(2)

b) Duncan took the test at a later date. When his result was included with those above, the mean mark became 23. What did Duncan score in the test?

……………..

(3)

(Total 5 marks)

8. $P = x^2 - 5x$

Find the value of P when $x = -4$

$P = \text{.........................}$

(Total 2 marks)

9. There are 40 chocolates in a box.
12 chocolates are plain chocolates.
The remaining chocolates are milk chocolates.

(a) Work out the ratio of the number of plain chocolates to the number of milk chocolates in the box.
Give your ratio in its simplest form.

....

(1)

Some plain chocolates are added to the box so that the ratio of the number of plain chocolates to the number of milk chocolates is 1: 2

(b) Work out how many plain chocolates are added to the box.

....

(2)
(Total 3 marks)

10. Four teams, City, Rovers, Town and United play a competition to win a cup.
Only one team can win the cup.

The table below shows the probabilities of City or Rovers or Town winning the cup.

City	Rovers	Town	United
0.38	0.27	0.15	x

Work out the value of x.

....

(Total 2 marks)

11. Plain tiles cost 28p each.
Patterned tiles cost £9.51 each.

Julie buys 450 plain tiles and 15 patterned tiles.

(a) Work out the total cost of the tiles.

£ ………………...

(2)

(b) Express 15 as a fraction of 450
Give your answer in its simplest form.

………………...

(1)

Fred lays the tiles.
He charges £423 which includes VAT at 17.5%.

(c) Work out the total amount that Fred charges before the VAT is added.

£ ………………...

(2)

(Total 5 marks)

12. (a) The equation

$$x^3 + 4x^2 = 100$$

has a solution between 3 and 4
Use a trial and improvement method to find this solution.
Give your answer correct to one decimal place.
You must show **ALL** your working.

$x =$ ....
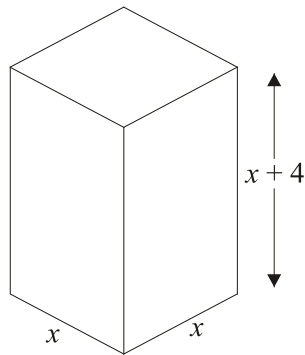**(4)**

The diagram shows a cuboid.

Diagram **NOT** accurately drawn

The base of the cuboid is a square of side x cm.
The height of the cuboid is $(x + 4)$ cm.

The volume of the cuboid is 100 cm^3.

(b) (i) Show that $x^3 + 4x^2 = 100$

(2)

(ii) Use your answer to part (a) to write down the height of the cuboid,
correct to 1 decimal place.

.... cm
(1)
(Total 7 marks)

13. The price of all rail season tickets to London increased by 4%.

(a) Before this increase, the price of a rail season ticket from Reading to London was £2664
Work out the price after the increase.

£ ....

(3)

(b) The price of a rail season ticket from Cambridge to London increased by £121.60
Work out the price before this increase.

£ ....

(2)

(c) After the increase, the price of a rail season ticket from Brighton to London was £2828.80
Work out the price before this increase.

£ ....

(3)

(Total 8 marks)

14. The fraction, p, of an adult's dose of medicine which should be given to a child who weighs w kg is given by the formula

$$p = \frac{3w + 20}{200}$$

(a) Use the formula $p = \frac{3w + 20}{200}$ to find p when the weight of a child 53.66 kg.

....

(2)

(b) Make w the subject of the formula $p = \frac{3w + 20}{200}$

$w = $ ....

(3)

(Total 5 marks)

15. Jeremy designs a game for a school fair.

He has two 5-sided spinners.

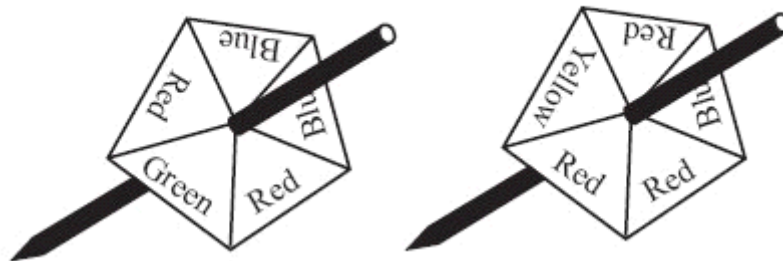The spinners are equally likely to land on each of their sides.

One spinner has 2 red sides, 1 green side and 2 blue sides.

The other spinner has 3 red sides, 1 yellow side and 1 blue side.

(a) Calculate the probability that the two spinners will land on the same colour.

....
(3)

The game consists of spinning each spinner once.

It costs 20p to play the game.

To win a prize both spinners must land on the same colour.

The prize for a win is 50p.

100 people play the game.

(b) Work out an estimate of the profit that Jeremy should expect to make.

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