ST EDWARD'S OXFORD

PIETAS PARENTUM

13+ SCHOLARSHIP EXAMINATION 2013

MATHEMATICS
Paper 1

1 hour

Name: _____

There are 60 marks available.

NO Calculators are allowed.

Write all answers, including your workings, in this booklet.

1. (a) Circle all of the fractions below which are **smaller than** $\frac{1}{9}$

$$\frac{1}{10} \qquad \frac{4}{9} \qquad \frac{1}{2} \qquad \frac{1}{100} \qquad \frac{1}{8}$$

1 mark

(b) Complete the sentences below:

$\frac{1}{9}$ is half of ....

$\frac{1}{9}$ is two thirds of ....

There are .... ninths in $6\frac{1}{3}$

3 marks

(c) Put these numbers in order, smallest to biggest.   Some may have the same value.
Insert the symbols < or = between successive terms in your list as appropriate.

$$\frac{5}{4}, \quad 0.54, \quad 1.25, \quad \frac{27}{50}$$

3 marks

TOTAL MARKS 7

2. The ancient Egyptians used fractions, but only *unit* fractions.

$\frac{1}{3}, \frac{1}{8}, \frac{1}{5}$ are all examples of unit fractions; the numerator must be 1 and the denominator is an integer greater than 1.

For $\frac{3}{4}$, they wrote the sum $\frac{1}{2} + \frac{1}{4}$

(a) For what fraction did they write the sum $\frac{1}{2} + \frac{1}{5}$?   Show your working.

....

1 mark

(b)   They wrote $\dfrac{9}{20}$ as the sum of two unit fractions.   One of them was $\dfrac{1}{4}$

What was the other?   You must show your working.

....

2 mark

TOTAL MARKS 3

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3.   a) Solve this equation: $75 + 2t = 100 - 2t$

....

2 marks

b) Simplify this expression: $7(5y - 3) - 10 + 2(3y - 5) - 3(5-7y)$

....

3 marks

c) Factorise this expression: $9x^2 y - 3xy^2 + 3xy$

....

3 marks

TOTAL MARKS 8

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4. (a) A rectangle is 3a units long and 5b units wide. Write a simplified expression for the area and the perimeter of this rectangle.

Area: ....

1 mark

Perimeter: ....

1 mark

(b) A different rectangle has **area 12a^2** and **perimeter 14a.** What are the dimensions of this rectangle?

Dimensions: .... by ....

1 mark

TOTAL MARKS 3

5. a) What is 55% of 60?

b) What is 125% of 24?

c) What is 30% of 40% of 50?

d) Which calculation below decreases a number by 30% - circle the correct one.

$\times\,70$ $\div\,30$ $\times\,1.3$ $\times\,0.7$ $-\,30$

TOTAL MARKS 5

6. Ian started to walk from A to B, but gave up 6 miles after he had passed the half way mark. He was then 5 miles from B. How far is it from A to B?
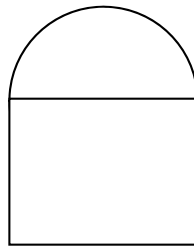
TOTAL MARKS 2

7. This drawing is made up of 9 equal squares. The perimeter is 128cm. Find its area.
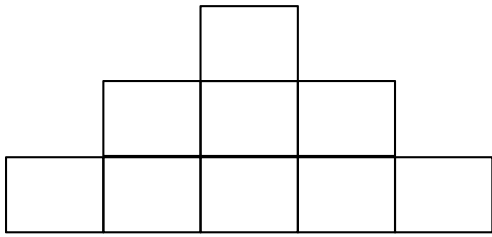
8. A window is made with two pieces of glass - one is semi-circular, the other is square.

The area of the square is 1m². What is the approximate area of the semi-circle? Give your answer in cm² to the nearest whole number.

9. (a) Estimate the answer to $\dfrac{8.62 + 22.1}{5.23}$

Give your answer to **1 significant figure**.

....

1 mark

(b) **Estimate** the answer to $\dfrac{28.6 \times 24.4}{5.67 \times 4.02}$

....

1 mark

TOTAL MARKS 2

10. Complete the sentences:

(i) **2 m 12cm = _____ mm**

(ii) **4 h 12 min = _____ hours**

(iii) **20 km/h = _____ m/s**

(iv) **40cm^3 = _____ m^3**

TOTAL MARKS 4

11. (a)   Each of these calculations has the same answer, **60.**   Fill in the gaps:

2.4 × 25 = 60	**600 ÷ 10 = 60**
0.24 × ………. = 60	6 ÷ …………. = 60
2400 × ………. = 60	0.06 ÷ ………. = 60

TOTAL MARKS 4

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12. (a) Find the values of a and b when $p = 10$

$$a = \frac{3p^3}{2}$$

$a =$ ....

1 mark

$$b = \frac{2p^2(p-3)}{7p}$$

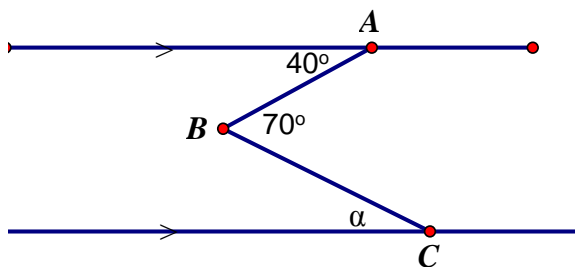$b =$ ....

1 mark

(b)   Simplify this expression as fully as possible:

$$\frac{3cd^2}{5cd}$$

1 mark

TOTAL MARKS 3

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13.   Calculate the size of the angle marked α:

TOTAL MARKS 3

14. X, Y and Z share some sweets between them in the ratio 2:3:5. Z receives 60 more sweets than X. Find the total number of sweets shared between the three boys.

15. To cover a distance of 10km, Jacob runs some of the way at 15 km/hr, and walks the rest of the way at 5 km/hr. His total journey time was 1 hour. How far did Jacob run?

16. David puts five cards face down on a table. All have the same design on the back – on the other side, one shows a circle, two show squares, and two show triangles. He turns two cards over. What is the probability that at least one of the cards is a square?

END OF TEST