OUNDLE

School

ACADEMIC SCHOLARSHIP 2012

MATHEMATICS

PAPER 1

1½ hours

CALCULATORS MAY NOT BE USED FOR THIS PAPER.

INSTRUCTIONS TO CANDIDATES.

You are not expected to have time to do all the questions.

You may answer the questions in any order.

Choose those questions which you think you can answer best.

***Remember to show your working and clearly show the method you are using**.*

1. Work out the following – using the neatest method you can.

a) $157.3 - (26.4 + 0.9) =$ [2]

b) $(0.598 + 0.044) - (0.335 + 0.007) =$ [2]

c) $(17 \times 12) + (13 \times 12) =$ [2]

2. Calculate: a) $\frac{0.024 \times 0.06}{0.0009}$ [3]

b) $27½\%$ of £14 [3]

c) $3\frac{1}{5} \times 1\frac{7}{8}$ [3]

d) $2\frac{1}{4} + 5\frac{1}{6}$ [3]

3. Expand out and simplify, where appropriate:

a) $3x(2x - 5)$ [2]

b) $3 - 2(x - 5)$ [2]

c) $4x - 2y(x - 3) - 9y - 5xy$ [3]

4. Solve the following equations:

a) $7(2x - 3) = \frac{1}{2}(x + 3) + 72$ [4]

b) $\frac{14}{y} = 70$ [3]

c) $(3x - 4)^2 = 25$ [5]

5. Solve the following simultaneous equations:

a) $6x + 3y = 4$

$10x - 9y = 2$

b) Use your answer from (a) to WRITE down the solutions to the following simultaneous equations. Long working is not necessary.

$\frac{6}{x} + \frac{3}{y} = 4$

$\frac{10}{x} - \frac{9}{y} = 2$ [8]

6. I bought an Olympic souvenir mug and an Olympic souvenir towel, and then sold them for £32 each. I made a 60% profit on the sale of the mug and a 20% loss on the sale of the towel. How much money did I make or lose? [6]

7. $\frac{1}{5}(2x-1)$ and $\frac{1}{3}(x+3)$ are consecutive whole numbers. What are the numbers?

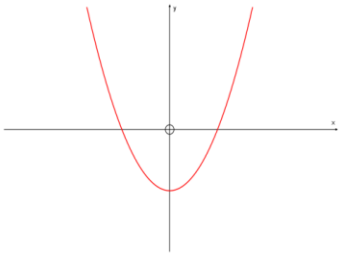
Is there more than one answer? Give your reasoning. [8]

8. a) The mean weight of six Olympic gymnasts is 55kg, and the mean weight of ten Olympian weightlifters is 100kg. What is the mean weight of the sixteen competitors?

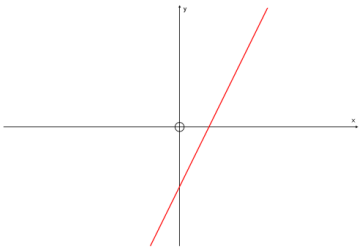
b) Four Olympic rowers join the group. How much do they each weigh if the mean of all twenty competitors has become 84kg. [8]

9. Match the following graphs to their equations, giving reasons to support your answers if you can. You should write your answers by listing Graph 1, Graph 2, Graph 3, Graph 4, Graph 5, Graph 6 and writing Equation A, B, C, D, E, or F beside it.

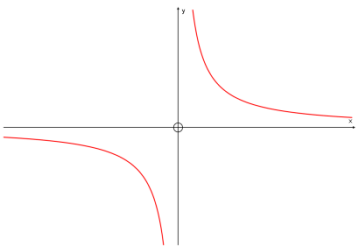
Graph 1:



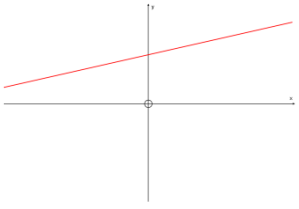
Graph 2:



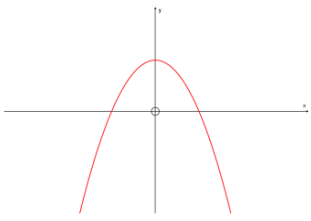
Graph 3:



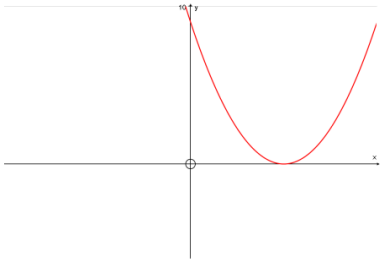
Graph 4:



Graph 5:



Graph 6:



Equations A $y = 3 - x^2$ B $y = 3x - 3$ C $y = (x-3)^2$

D $y = \frac{3}{x}$ E $y = x^2 - 3$ F $y = \frac{x}{3} + 3$ [12]

10. a) Find as a single fraction the mean of the numbers $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$

b) If a new number is included so that the mean of the five numbers is $\frac{1}{3}$, find the new number as a fraction in its simplest form. [8]

11. In a sequence, if a particular term is a, then the next term is $\frac{1}{1+a}$.

a) If the first term is 1, find the next six terms (as fractions);

b) If the fifth term is $\frac{19}{31}$, find the first term. [9]

12. A number can be written as a product of its prime factors

Eg $840 = 2^3 \times 3 \times 5 \times 7$

a) Write 28224 as a product of its prime factors.

b) Use the answer above to work out $\sqrt{28224}$

c) Simplify $\sqrt{25x^2y^{16}}$ [10]