



OUNDL E

School

2015 Academic Scholarship

Mathematics

Paper I

Time Allowed: **1 hour and 30 minutes**

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 can answer best
- Remember to **show your working** and clearly show the method you are using
- Give answers to 3 significant figures where needed.
- π may be taken to be 3.14
- The number of marks for each question are show in square brackets

1. Work out the following:

a) 20% of 30% of 350

b) $\sqrt{\frac{0.8 \times 0.02 \times 2}{0.008}}$

c) $5\frac{1}{4} \times 3\frac{3}{7}$ (leave your answer as a mixed number) [9]

2. Simplify the following expressions:

a) $6a + 3ab - 4b + 5a - 2b$

b) $8x^2 - 5x(x - 3)$

c) $6x^3 \div 2x^2$

d) $5x - 2(2 + x) - (x - 2)$ [10]

3. Solve the following equations:

a) $4(2x - 1) - 3 = 17$

b) $\frac{3x}{4} - \frac{3-x}{3} = 0$

c) $y^2 - 36 = 0$ [9]

4. a) I think of a number and subtract 3. I divide the result by 4 and get 9. What was my number?

b) I think of a number, multiply it by 3 and then add 7. The square root of the answer is 7. What was my number?

[4]

5. Simplify the following into a fraction in its lowest terms:

$$1\frac{1}{2} \times 1\frac{1}{3} \times 1\frac{1}{4} \times 1\frac{1}{5} \times 1\frac{1}{6} \times 1\frac{1}{7} \times 1\frac{1}{8} \times 1\frac{1}{9} \times 1\frac{1}{10}$$

[4]

6. James spent $\frac{1}{4}$ of his life growing up, $\frac{1}{5}$ of his life in college, half his life as a teacher and the last 6 years in retirement. How old was James when he died?

[4]

7. Solve the following pair of equations for x and y :

$$x + y = 12$$

$$x - y = 6$$

[3]

8. In the following equations, each letter stands for a different single digit number. Find the value of each letter.

[4]

$$A \times B = G$$

$$G \times I = G$$

$$A \times A \times A = H$$

$$C - E = B$$

$$B \times B = D$$

$$H \times F = F$$

9. a) Find the prime factors of 2015.
b) Hence, or otherwise, find all of the factors of 2015.

[6]

10. I went shopping in the sales and bought a shirt which cost me £22.50 at 25% off, trousers which cost me £26.40 at 1/3 off and 3 pairs of socks on which I spent £8.60 in a "Buy 2, Get 1 Free" promotion. If I had gone shopping before the sale, how much more would I have paid for my clothes?

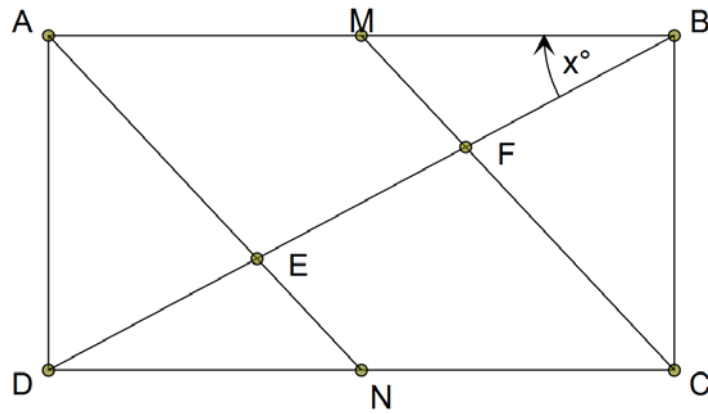
[4]

11. In their 2015 Six Nations Rugby triumph, the winning Ireland team had a pack of 8 players whose mean weight was 102kg. In the second half, 4 of these players whose mean weight was 98kg were replaced by 4 players whose individual weights were 96kg, 100kg, 108kg and X kg. The mean weight of the pack of 8 players now rose to 104kg. Find the value of X .

[6]

12. In the diagram below, ABCD is a rectangle and M and N are the midpoints of the sides AB and CD respectively. If the length of AB is 2cm and AD is 1cm, find the size of angle DEN in terms of x .

[6]



13. Sometimes I cycle to school and sometimes I walk. If it is icy, the probability that I walk is 0.8 but if it is not icy, the probability that I cycle is 0.9. In February 2015, there were 7 days on which it was icy in the morning in Oundle. If a day in February is chosen at random, what is the probability that I cycled to school on that day?

[6]