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School

Academic Scholarship 2014

Mathematics

Paper 1

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



1. Work out the following:

a) 2.8×12.42

b) $\sqrt{\frac{75000}{0.003}}$

c) $2\frac{2}{3} + 5\frac{3}{7}$ (leave your answer as a mixed number) [9]

2. In each part of the following question, the answer is fairly close to one of the following numbers.

0.003, 0.02, 0.15, 1.5, 8, 15, 20, 30, 80, 150, 200, 300, 800

Without doing lengthy calculations, find which of these numbers is nearest the answer:

a) $1 \div 0.12$

b) 0.036×0.08

c) $3.68 \div 0.018$

d) 0.052×298 [8]

3. Simplify the following expressions:

a) $12x + 3y - 4x + y$

b) $2y^2 - 5y - y^2$

c) $5y \times (2x)^4 y$

d) $3 - 4(x - 2) - (x - 2(2 + x))$ [10]

4. Solve the following equations:

a) $3(x + 1) - 2x = 13$

b) $\frac{2x-1}{2} - \frac{x+5}{3} = -2$

c) $(x - 2)^2 = 0$ [9]

5. If $\frac{2}{x+4} = -1$ find the value of $\frac{2}{x+8}$ [6]

6. Calculate the following as efficiently as you can (showing your working):

a) $212-213+214-215+216-217+218-219+220$

b) $3254 - 2176 - 24$

c) 175×28

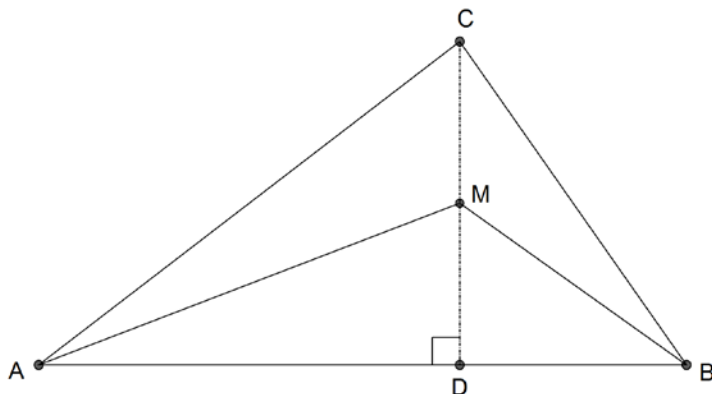
[6]



7. In 2013, Stanwick Lakes had a population of 400 fish of which $\frac{1}{4}$ were trout, 40% were bass and the remainder were catfish. By 2014 the number of trout had increased by half and the number of catfish had doubled. If the population of fish in 2014 is 750, by what percentage has the number of bass fish changed? [6]

8. 2 classes of pupils sit the same exam. The first class of 6 pupils achieves a mean score of 64% and the second class of 18 pupils achieves a mean score of 76%. What is the overall mean score for all of the pupils in this test? [6]

9. a) Triangle ABC (shown in diagram below) has an area of 174cm^2 . The line CD is perpendicular to side AB and the point M is the midpoint of CD. Find the area of triangle AMB.

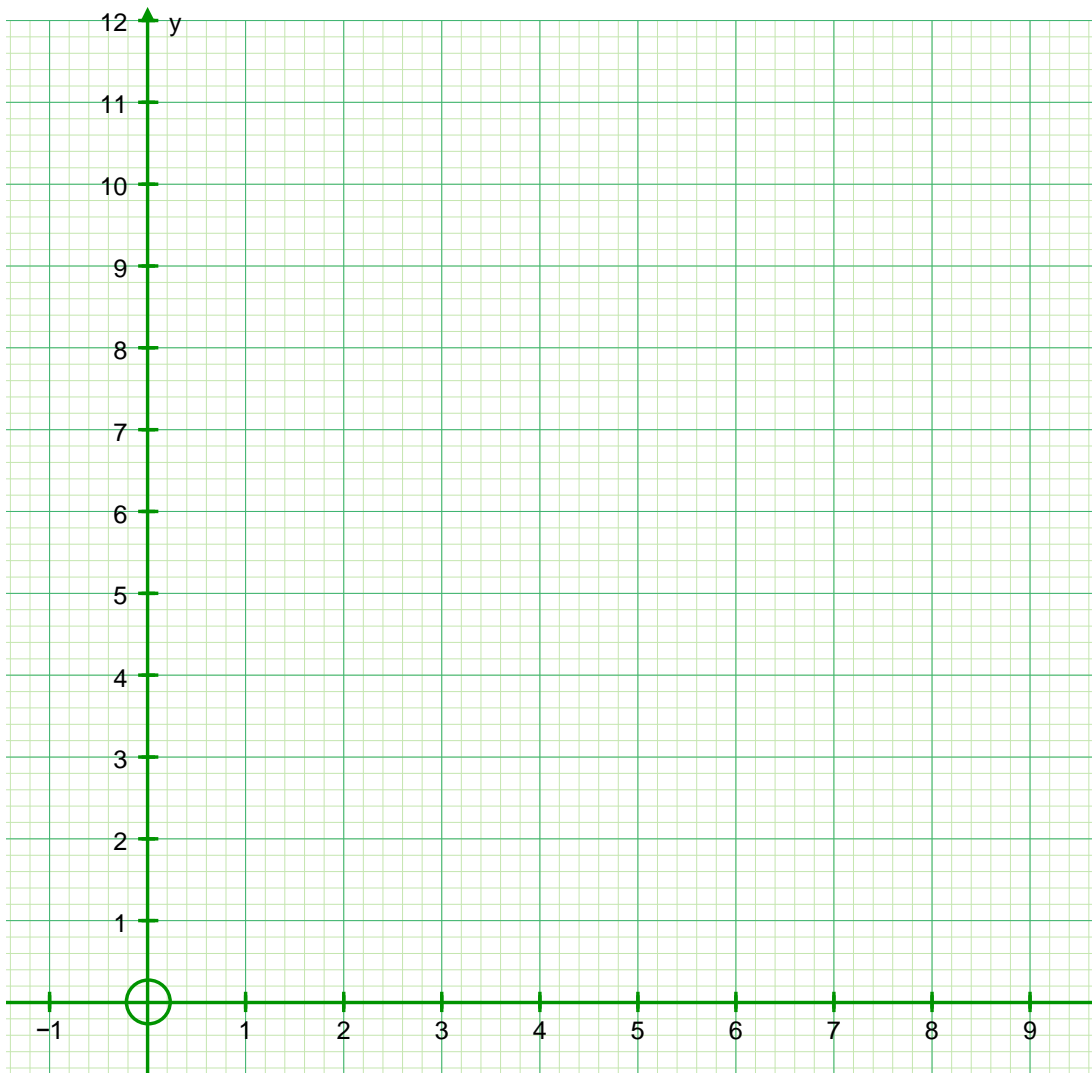


b) Another triangle PQR has an area of 48cm^2 . Point D lies on the line PR such that the ratio of lengths PD:DR is 1:2. Find the area of triangle PDQ. [10]

10.

- a) P is the point with coordinates (4,5) and Q is the point with coordinates (3,2). Plot the points P and Q on the graph below.
- b) P and Q are 2 vertices of a rhombus PQRS. Point R, which has positive x and y coordinates, lies along the line $y = 11 - 3x$. Find the point R and mark it on the graph.
- c) Hence find the coordinates of S, mark this point on the graph and mark the edges of the rhombus PQRS.
- d) Write down the equation of any lines of symmetry of the rhombus PQRS.

[10]



Total: 80 marks