OUNDLE

School

Academic Scholarship 2013

Preliminary Examination

Mathematics

Time Allowed: 1½ hours

- **Calculators may NOT be used.**
- Write your answers on **lined paper** and **show as much working as possible**. **Answers without clear logical working will gain little credit.**
- Do not spend too long on any single question. If you are having difficulty with a particular question, move on and return to it at the end if you have time. Do not be concerned if you cannot answer all of the questions.
- **At the end of the examination**, hand in both the question paper and your answers with your name clearly indicated on all sheets.

1. Work out :

(a) $65 + 39$

(b) 68×39

(c) $6\,000 \times 1.2$

(d) $6\,000 \div 1.2$

(e) 0.12×0.08

(f) $\dfrac{24}{0.08}$

(g) $\sqrt[3]{64}$

(h) $\sqrt{360\,000}$

(i) $8 \div 0.25 + 3 - 2 \times 2.5$

(j) $12\frac{1}{2}\%$ of 240

(k) $3^3 - 2^2 - 1^1$

(l) $\frac{7}{12} + \frac{3}{8}$

(m) $4\frac{1}{6} \div 1\frac{2}{3}$

(n) $5^0 - 0^5$

(o) 80% of 80 − 60% of 60

2. Remove brackets and simplify fully :

(a) $-2(2 - 4x)$

(b) $3(2x - 1) - 4(1 + x)$

(c) $6 - (1 - x) - x$

3. Solve each equation for x :

(a) $4(x-1) = 10$

(b) $\frac{2x}{3} = 4$

(c) $\frac{3}{2x} = 4$

(d) $\frac{x}{3} + x = 16$

4. Solve for x and y :

$$3x + 5y = 6$$
$$4x - 2y = -5$$

5. For the numbers 24 and 36, the highest common factor (HCF) is 12 and the lowest common multiple (LCM) is 72.

(a) Write down the LCM of $4x^2yz^3$ and $6xy^2$

(b) Write down the HCF of $18x^3y^2z$ and $24xy^3z^2$

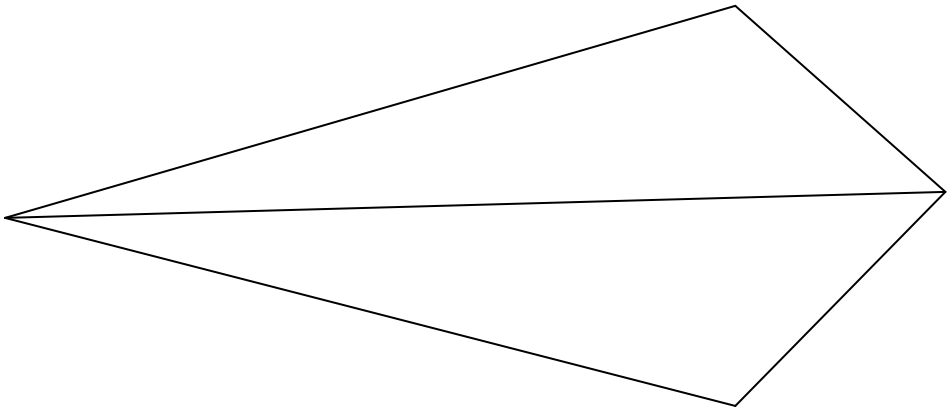
6. Factorise fully :

(a) $2y - 12$

(b) $4y - y^2$

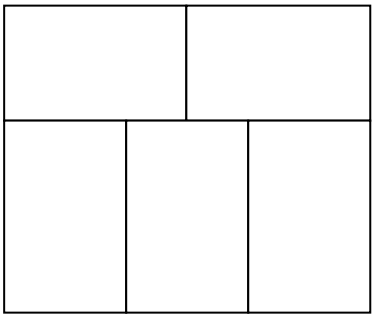
(c) $6xy^3 - 9x^3y$

7.



The diagonals of a kite are 4 cm and 11 cm long. Find the area of the kite.

8.



A rectangle with perimeter 176 cm is divided into five identical rectangles as shown.

What is the perimeter of one of the small rectangles ?

9. A neat mathematical result is that $(x + y)(x - y) = x^2 - y^2$

Use this result to work out the value of : $676^2 - 324^2$
(no marks will be awarded for a correct answer obtained through any form of long multiplication)

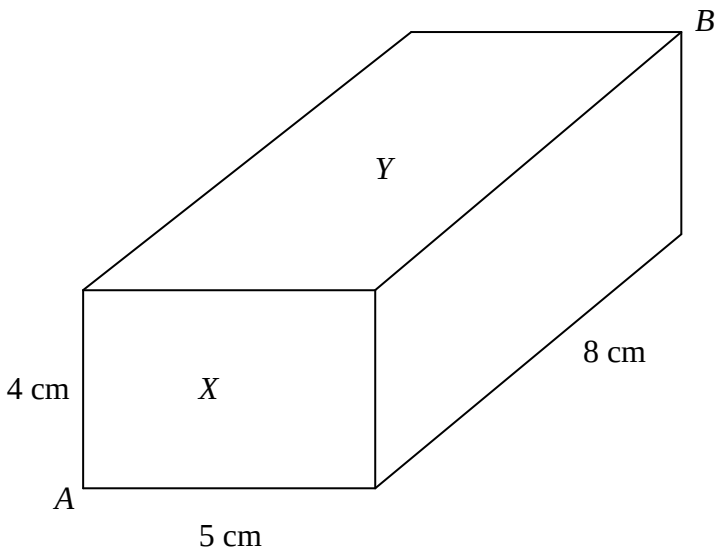
10. $P = 28 \times 301$

$Q = 14 \times 601$

Without working out *P* or *Q*, find the value of $P - Q$

(You must show all the steps of your working, so that it is clear how you obtained your answer without working out P or Q.)

11.



A cuboid of dimensions 4 cm by 5 cm by 8 cm is shown.

An ant has to get from point *A* to point *B* by crawling along the faces of the cuboid marked *X* and *Y*. Calculate the shortest possible distance the ant can travel from *A* to *B* .

12. If the number 3^{2013} were written out in full, what would the last digit be ?

(A correct answer without working will earn no marks. Your working must show clearly how you obtained your answer).

13. In Mathematics, $n!$ is called ' n factorial ' and this is how it works :

$$n! = 1 \times 2 \times 3 \times ... \times n$$

So, for example, $3! = 1 \times 2 \times 3$ and $5! = 1 \times 2 \times 3 \times 4 \times 5$

If the number $25!$ were written out in full, how many zeros would there be at the end ?

(A correct answer without working will earn no marks. Your working must show clearly how you obtained your answer).

END