

JETS OF ZAMBIA

MUCHINGA PROVINCE

**2016 DISTRICT JETS FAIR**

**JUNIOR MATHEMATICS OLYMPIADS**

1. (a) Express the following numbers in standard form correct to 2 significant figures.
- (i) 249.526 [1]  
(ii) 0.39811 [1]
- (b) Estimate the value of  $1.7871 \times 29.8902$  correct to 1 significant figure. [1]
- (c) If  $x = 3 \times 10^6$ , and  $y = 2 \times 10^{-3}$  find the value of each of the following expressing your answers in standard form.
- (i)  $x^2$  [2]  
(ii)  $\frac{6}{x}$  [1]
- (a) Evaluate  $2\frac{1}{3} \div (2\frac{1}{2} - 1\frac{4}{5}) + 1\frac{3}{4}$  [2]

**Total 10 Marks**

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2. (a) Express 2.5 metres as a percentage of 6 metres [2]  
(b) Simplify  $2x^{\frac{1}{2}} \times 3x2^{\frac{3}{2}}$  [2]  
(c) Find the value of n given that  $2^n = 64$  [1]  
(d) Given that  $5x = 3y$ , find the ratio of x: y [1]  
(e) Find the value of  $16^{\frac{3}{4}}$  [2]  
(f) Find the mid-most fraction between  $\frac{1}{4}$  and  $\frac{4}{5}$  [2]

**Total 10 marks**

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3. (a) Mr Musonda who is a street vendor bought 100 loaves of bread at K6 each. He sold half of them at K8 each and sold the rest at K5 each. Find his profit or loss on the deal. [4]
- (b) Find x, if the mean of numbers 7, 5x, 2x, 8, and 3x is 7. [4Marks]
- (c) For the function  $f(x) = \frac{5x-3}{x}$ , find
- (i)  $f(3)$  [3]  
(ii)  $f(-3)$  [3]

**Total 10 marks**

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4. (a) In a group of 30 boys, 8 did French only and 14 did Commerce only.  
If 2 did neither, how many boys did both French and commerce? [2]
- (b) Illustrate in a Venn diagram [4]
- (c) Evaluate  $111_{\text{two}} \times 11_{\text{two}}$  [3]
- (d) If  $a^2 - b^2 = (a + b)(a - b)$ , apply this rule to evaluate  $600^2 - 599^2$ . [1]

**Total 10 Marks**

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5. (a) Make a table of values for the mapping  $f(x) \rightarrow x^2$  from  
set  $x = \{-3, -2, -1, 0, 1, 2, 3\}$  to the set of integer numbers. [5]
- (b) Plot the points in (a) on the XY plane and draw a smooth curve  
through the points [4]
- (c) What is the special name for the curve that is formed? [1]

**Total 10 Marks**

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5. (a) A train takes 40 minutes to cover the distance from Kasama to Nseluka when it  
travels at 80km/h. How long will it take when it travels at 50km/h? [4]
- (b) Factorize completely  $12x^2y^2 + 4x^2y - 12x^2$  [3]
- (c) given that  $Y = \frac{2a+3x}{x}$ , make x the subject of the formula [3]

**Total 10 Marks**

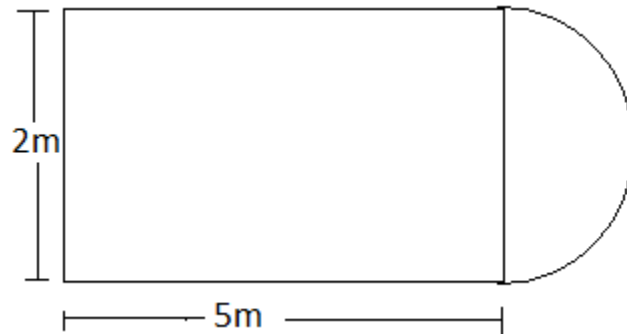
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6. (a) Solve the following equation
- (i)  $\frac{x+2}{3} = 2x$  [2]
- (ii)  $w^2 + 4w + 4 = 0$  [5]
- (b) If  $x*y$  implies  $x^2 + 2xy + y^2$ , find  $3*2$  [3]

**Total 10 Marks**

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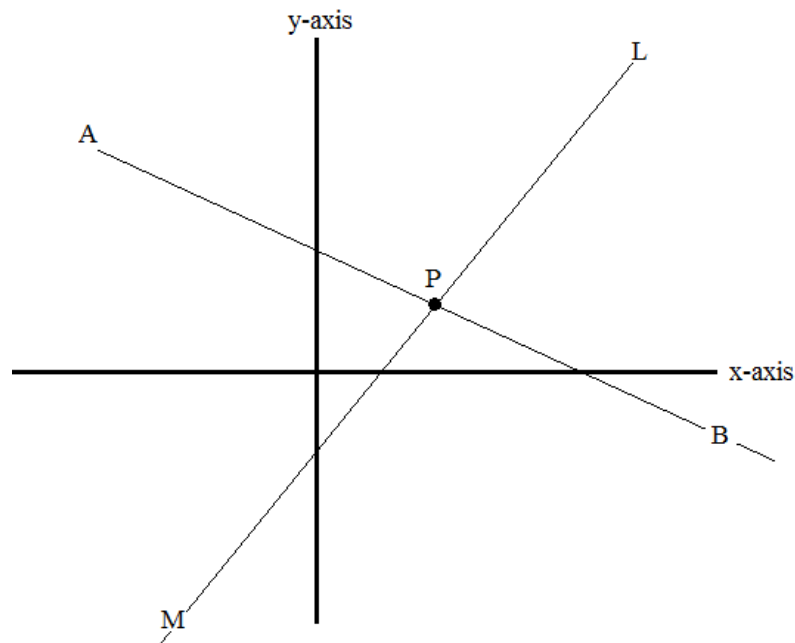
7. Use the information given in the diagram below to answer the questions that follows



Calculate

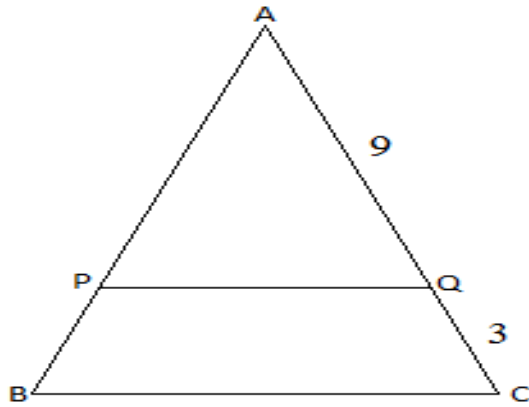
- (i) The perimeter of the flower bed [2 Marks]
- (ii) The area of the flower bed. [2 Marks]

In the diagram below, line AB is  $x + 2y = 1$  while line MN =  $3x - y = 1$  meet at point P. find the coordinates of point P.



Find the coordinates of point P [2]

- (d) In the diagram triangle ABC is congruent to APQ . PQ is parallel to BC and  $QC = 3$  cm.



- (i) The ratio  $BC:PQ$  [2]  
(ii) The ratio of the area of triangle APQ to triangle ABC [2]

**Total marks: 10**

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