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MATHEMATICS

Paper 2

2 ½ Hours

July 2014

BUGEMA ADVENTIST SECONDARY SCHOOL

MOCK EXAMINATION 2014

S.4 MATHEMATICS

Paper 2

TIME: 2 Hours 15 MINUTES

INSTRUCTIONS

- Attempt all questions in section **A** and **ONLY** five questions in section **B**.
- All necessary calculations must be shown.
- Logarithm tables and calculators can be used.

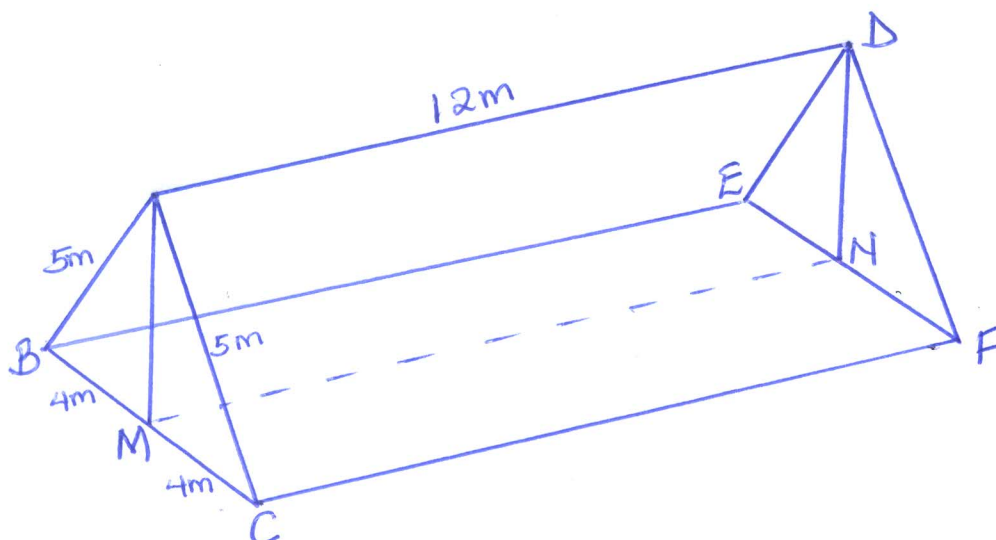
Turn Over

SECTION A

1. Given that $\overrightarrow{AX} = \begin{pmatrix} -1 \\ 5 \end{pmatrix}$ and $\overrightarrow{AY} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$
Find $\left| \overrightarrow{XY} \right|$
2. Simplify as far as possible
 $64^{-1/3} \times 16^{3/4} \div \left(\frac{8}{27} \right)^{-2/3}$
3. The gradient of a line through the point (5, 2) is $\frac{y}{x-3}$.
Find the equation of the line.
4. $\log_{10} A = 3.812$ and $\log_{10} B = \bar{2}.2573$
Find (a) AB (b) $\frac{A}{B}$
5. On a map, a forest of area 75km^2 is represented by 12cm^2 , Find the representative fraction on a map.
6. A cube has a total surface area of 600cm^2 .
Calculate
(a) The volume
(b) The length of the diagonal of each face.
7. The function $h(x) = \frac{4x-2}{x^2-9}$
Find (i) $h(0)$ (ii) Values of X for which $h(x)$ is not defined.
8. John sold a shirt at $45,000/\text{=}$. If he made a profit of 20%. Find the cost of the shirt.
9. A car covered 60km at a speed of 30km/hr, and then the next 80km were covered in $1\frac{1}{2}$ hours. What was the average speed for the whole journey?
10. Without using tables or calculators, evaluate.
 $\frac{\sqrt{125}}{\sqrt{81}} \times \frac{\sqrt{162}}{\sqrt{50}}$

SECTION B

11. (a) The gradients of two lines m and n are $\frac{4}{9}$ and $\frac{7}{5}$ respectively. If the lines m and n meet at (5, 6). Find their equations.
(b) A line P which passes through the origin, also passes through (3, 1) and (6, K).
Find the value of K.
12. The diagram shows the roof of a house.



Calculate

- (a) $\overline{AM}$ and $\overline{DC}$
- (b) The area of Triangle ABC.
- (c) The volume of the roof space.

13. (a) Find the integral values of X which satisfy.

$$7 \geq 4 - 3x > -3$$

and represent the solution on a number line.

- (b) Show the region on the graph defined by

$$y \leq x + 1, \quad x \leq 4 \text{ and } y \geq 1.$$

by shading the unwanted regions. Find the area of the wanted region.

14. From the air strip at town A, an aero plane moves at a bearing of 090° to town B, a distance of 200km. It then moves at a bearing of 020° a distance of 300km to town C. At town C, it rests for two hours and then moves at a bearing of 170° to town D, which is 500km from town C. If 1cm represent 50km.

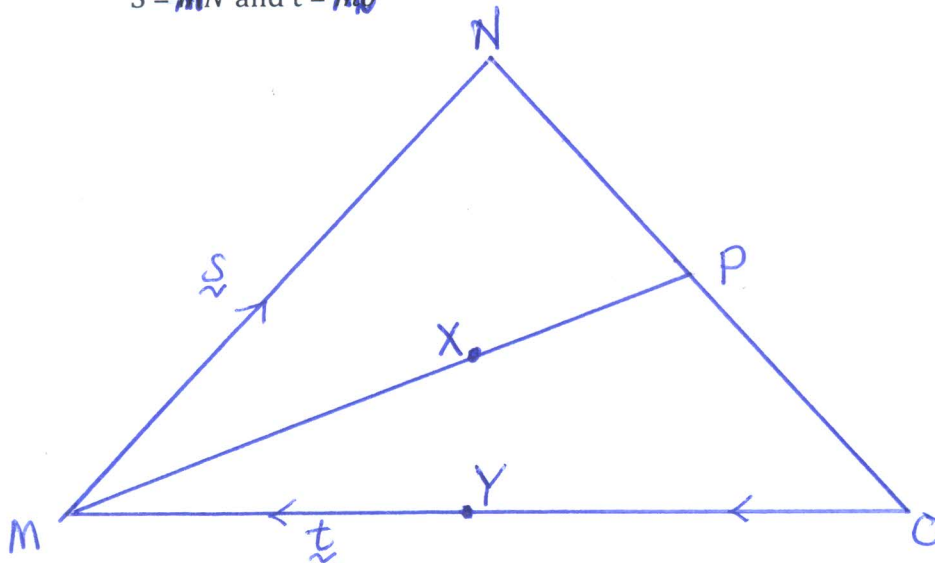
- (a) By scale drawing, show the journey of the aero plane. Find

(i) Shortest distance between A and D.

(ii) Bearing of A from D

(iii) Time spent if the plane traveled at a constant speed of 80km/hr for the whole journey.

15. In the diagram below P is the mid-point of $\overline{ON}$, $MY = YO$ and $\overrightarrow{MX} = 2 \overrightarrow{XP}$. Given $S = \overrightarrow{MN}$ and $t = \overrightarrow{MO}$



(a) Find in terms of S and t

- (i) $\overrightarrow{MP}$
- (ii) $\overrightarrow{NX}$
- (iii) $\overrightarrow{NY}$

(b) Show that M, X and Y lie in the same straight line.

16. (a) Rationalize $\frac{7}{2\sqrt{3}-\sqrt{5}}$ in the form $a\sqrt{b} + c$

State the values of a, b and c

(c) Given an equilateral triangle of length L units, without using calculators or tables.

- Find (i) $\sin^2 30^\circ + \cos^2 30^\circ$
(ii) $\tan 60^\circ$

17. (a) If $h(x) = nx + 7$ and $h(5) = 22$,

Find (i) the value of n
(ii) $h(4)$

- (b) Given that $f(x) = 8x^2 + 5$, Find
(i) $F(-3)$ (ii) $F(2)$
(ii) the values of x for which $F(x) = 293$.

END