Metric Academy

AS-Level Mathematics — SAMPLE PAPER

Mock Assessment – Set Yπ

Candidate Name:	**Centre Number:**

Paper Code: MA/AS-P1	**Time:** 2 hours
Total Marks: 100	**Calculator:** Allowed

Instructions:

- Answer all questions.
- You must show all your working.
- You may use a calculator unless told otherwise.

Information:

- The total number of marks for this paper is 100.
- The marks for each question are shown in brackets.

1.

The line l_1 has equation $3x + 2y - 5 = 0$.
The line l_2 has equation $y = mx - 4$, where m is a constant.
Given that l_1 and l_2 are perpendicular,

(a) find the value of m. (2)

(b) The lines l_1 and l_2 meet at the point P. Find the x-coordinate of P. (2)

2. Find, using algebra, all real solutions to the equation

(i) $9x^2 = 3\sqrt{x}$ (4)

(ii) $c^4 - 5c^2 - 24 = 0$ (4)

3. The triangle XYZ is such that

$$\vec{XY} = 4\mathbf{i} + 2\mathbf{j} \quad \text{and} \quad \vec{XZ} = 10\mathbf{i} - 8\mathbf{j}$$

(a) Find $\vec{YZ}$. (2)

(b) Hence find $|\vec{YZ}|$, giving your answer as a simplified surd. (2)

The point W lies on the line segment YZ such that $YW : WZ = 2 : 3$.

(c) Find $\vec{XW}$. (2)

4.

(a) Sketch the curve with equation

$$y = \frac{m}{x^2} \quad \text{where } m \text{ is a positive constant.}$$

(2)

(b) Hence or otherwise, solve the inequality

$$\frac{25}{x^2} < 1$$

(3)

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10. Given that

$$\log_2(x+1) + \log_2(x+2) = 1 + 2\log_2(x)$$

(a) Show that

$$x^2 - 3x - 2 = 0$$

[3]

(b) (i) Write down the solutions of the equation

$$x^2 - 3x - 2 = 0$$

[1]

(ii) Hence state which of the roots in part (b)(i) is not a solution of

$$\log_2(x+1) + \log_2(x+2) = 1 + 2\log_2(x)$$

Give a reason for your answer. [2]