

MATHEMATICS ASSIGNMENT FOR L5 ALL

01.

Given the function $f(x) = \frac{1}{x-3} + 2$.

- a) Find the domain of definition.
- b) Find asymptotes to the curve.
- c) Compute the first derivative and study its sign.
- d) Compute the second derivative and study its sign.
- e) Find the variation table.
- f) Find intercept point with axes.
- g) Sketch the graph of function $f(x)$.

1mark
3marks
3marks
2marks
2marks
2marks
2marks

02.

Find all the angles between 0 and 2π which satisfy the equation

$$(1 + 2\sin x)\cos 2x = 0.$$

4marks

03. A. Sketch the graph of $y = \cos x$, for values of x from 0° to 360° .

2marks

B. Sketch, on the same diagram, the graph of $y = \cos(x - 60^\circ)$.

2marks

C. Use your diagram to solve the equation $\cos x = \cos(x - 60^\circ)$.

2marks

04. Find the values of k for which the equation $x^2 + (k + 1)x + 1 = 0$ has

3marks

i) Two distinct real roots.

ii) No real roots.

05. Find a real number a such that $z = -i$ is a root for the polynomial

$P(z) = z^3 - z^2 + z + 1 + a$. Furthermore; for such value of a solve $P(z) = 0$ in \mathbb{C} . 5marks

06. Prove that all points satisfying $\left| \frac{z+1}{z+4} \right|$ lie on a circle.

Find its center and radius.

5marks

07.

The equation of a curve is $y = 4x^2 - x^3$. The gradient at the point M on the curve is 10. Find the equation of the tangent to the curve at M.

5marks

08.

Given curve $y = x^2$ and the line $y = x + 6$.

(i) Determine the coordinate of point of intersection of the curve $y = x^2$ and line $y = x + 6$.

5marks

(ii) Sketch the curve $y = x^2$ and $y = x + 6$ on the same axes.

5marks

(iii) Determine the area enclosed between the curve $y = x^2$ and $y = x + 6$.

5marks

09.

Solve the following equations :

15marks

a) $\ln(2x + 3) + \ln(-5x + 4) = \ln(-7x + 2)$

b) $z^4 - (8i - 1)z^2 - 8i = 0$