

Issues from P2

Proof in P2 has already been considered in a previous activity.

Which sections of the specification do students need to know to do the question?

Is the question suitable (with rigorous wording etc) for a written examination.

Is the question better suited to classroom use.

Avoid this question!

1. Draw a sketch of the curve with equation $y = 4x^3 - 16x^2 + 19x - 6$

Write on the sketch the coordinates of the points at which the curve cuts the axes.

2 $P(x) = 6x^3 + ax^2 + bx - 2$

When $P(x)$ is divided by $(x + 2)$ the remainder is -140

$(2x - 1)$ is a factor of $P(x)$

Can P be written as the product of three factors of the form $px + q$?

3 $P(x)$ is a cubic polynomial with the property that all the coefficients are integers with the term independent of x being d .

Given that $(x - n)$ is a factor of $P(x)$, with $n \in \mathbb{N}$, prove that d is a multiple of n .

4 Find, using calculus, the area of the finite region R above the x -axis bounded by the curves with equations

$$y = x^3 + 1 \quad \text{and} \quad y = 5 + 4x - x^2$$

5 A sequence S is defined by $u_{n+1} = a + b u_n$ where a and b are real numbers

(i) Show that for S to have period 2, b must be ± 1 and find a in each case.

(ii) Show that it is not possible for S to have period 3.

6 A sequence S is defined by $x_{n+1} = 2 + \frac{3}{x_n - 2}$ ($x_n \neq 2$)

(a) Suppose the first term of S is 5. Show that S is a periodic sequence

(b) Show, that in general, S is a periodic sequence of period 2