

IAL Activity 2 Answers

Issues from P2 responses

1 $P(x) = 4x^3 - 16x^2 + 19x - 6$

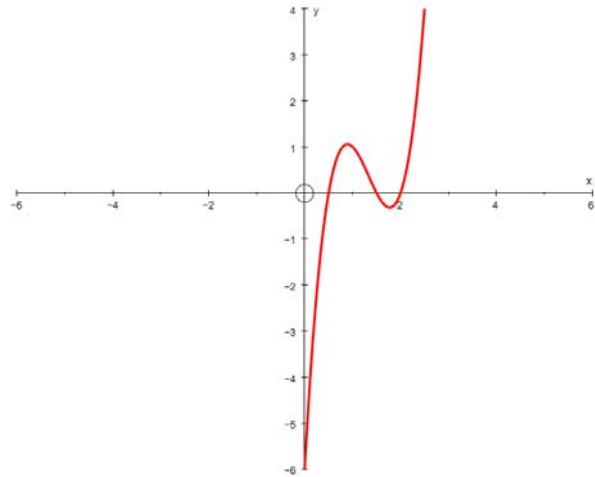
$$P\left(\frac{1}{2}\right) = 0 \quad \text{so } (2x - 1) \text{ is a factor}$$

$$P(x) = 4x^3 - 16x^2 + 19x - 6 = (2x - 1)(2x^2 - 7x + 6)$$

$$P(x) = (2x - 1)(x - 2)(2x - 3)$$

$$x = 1/2, 2, 3/2$$

$$y = -6$$



2 $-48 + 4a - 2b - 2 = -140$

$$\frac{6}{8} + \frac{a}{4} + \frac{b}{2} - 2 = 0$$

Rearrange and solve to get $a = -17$, $b = 11$

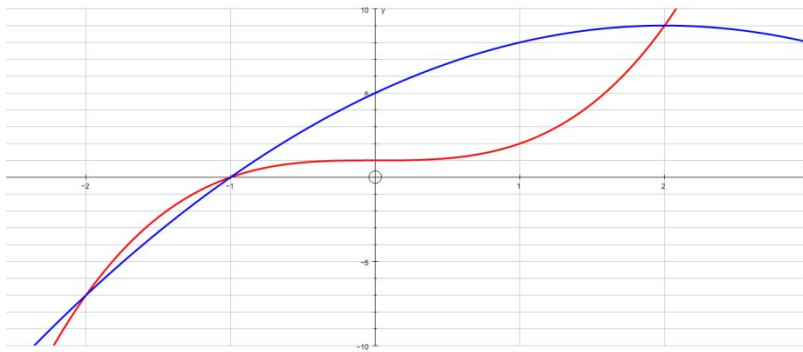
$$P = (2x - 1)(3x^2 - 7x + 2) \quad P = (2x - 1)(3x - 1)(x - 2) \quad \text{so yes}$$

3 $P(x) = ax^3 + bx^2 + cx + d$

$$P(n) = an^3 + bn^2 + cn + d = 0$$

$$d = -n(an^2 + bn + c) \quad \text{QED}$$

4



Cross at solutions of $x^3 + 1 = 5 + 4x - x^2$ which correspond to $x = -2, 2$

M1 M1 A1

$$\text{Area} = \int_{-1}^2 5 + 4x - x^2 - (x^3 + 1) dx = \left[4x + 2x^2 - \frac{x^3}{3} - \frac{x^4}{4} \right]_{-1}^2 = \frac{45}{4}$$

M1 M1 A1

5 (i) $u_2 = a + bu$ (say) $u_3 = a + bu_2 = a + b(a + bu)$

$$u_3 = u_1 = u \text{ so } a + ba + b^2u$$

For this to hold for all u we need $b^2 = 1$ so $b = 1$ (and $a = 0$) or $b = -1$ (and a arbitrary)

$$(ii) u_4 = a + bu_3 = a + b(a + ba + b^2u) = a + ba + b^2a + b^3u = u$$

For this to hold for all u we need $b^3 = 1$ so $b = 1$ (and $a = 0$)

6 (a) Sequence is 5 3 5 3 5.....

$$(b) \text{ Suppose } x_1 = x \quad x_2 = 2 + \frac{3}{x-2} \quad x_3 = 2 + \frac{3}{x_2-2} = 2 + \frac{3}{2 + \frac{3}{x-2} - 2}$$

$$x_3 = 2 + \frac{3}{\frac{3}{x-2}} = 2 + x - 2 = x \quad \text{QED}$$