

Maths Rules

Cubic Graphs and Quartic Graphs

Section A

1. Sketch the curves with equations

(a) $y = (x - 1)(x + 3)(x - 5)$

(b) $y = (x - 2)(x + 4)(x - 5)(x - 4)$

2. Sketch the curves with equations

(a) $y = x(3x - 2)(2x - 1)$

(b) $y = (5x + 4)(2x + 4)(x - 1)(x + 1)$

3. Sketch the curves with equations

(a) $y = (x - 2)^2(2x - 1)$

(b) $y = (x + 1)^2(x + 3)(x + 2)$

4. Sketch the curves with equations

(a) $y = (3 - x)(x - 7)(x + 1)$

(b) $y = (1 - x)(2 - x)(3 - x)(4 - x)$

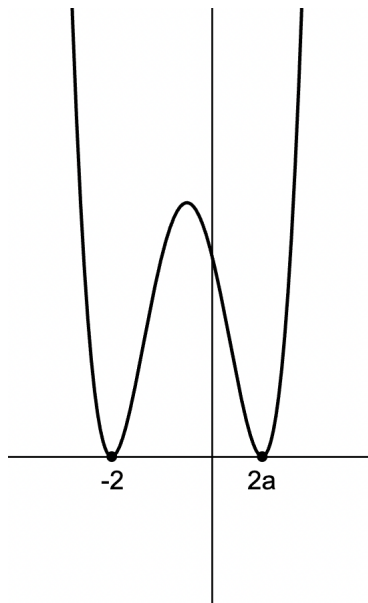
5. Sketch the curves with equations

(a) $y = 2x^3 - 7x^2 + 3x$

(b) $y = 3x^4 - 10x^2 + 3$

Section B

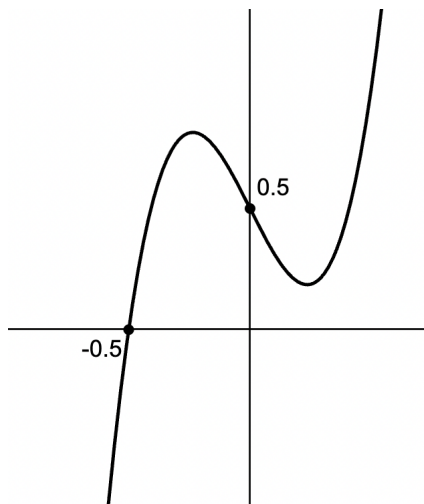
1. The graph of the quartic equation $y = x^4 + bx^3 + cx^2 + dx + e$ is shown below.



- (a) Show that $e = 16a^2$.
 (b) Find b, c , and d in terms of a .

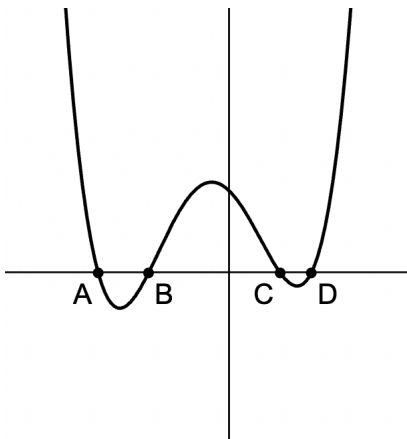
Given that $(-1, 4)$ is a point on the quartic,

- (c) Find the possible values of a .
 2. The cubic curve with equation $y = ax^3 - 2x + c$ is shown below.



- (a) Write down the value of c .
 (b) Show that $a = 12$.

3. The diagram below shows a quartic curve with equation $x^4 + ax^3 + bx^2 + cx + d$.



The points A, B, C , and D have coordinates $\left(-\frac{1}{2} - \frac{\sqrt{5}}{2}, 0\right)$, $(-1, 0)$, $\left(-\frac{1}{2} + \frac{\sqrt{5}}{2}, 0\right)$, and $(1, 0)$ respectively.

Find the values of a, b, c , and d .