

chapter

2

## Algebra 2

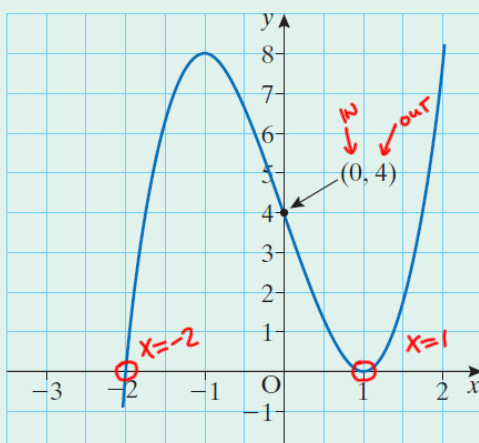
## Section 2.10 Graphs of cubic polynomials

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## Example 1

By examining the graph, find an expression for this cubic polynomial.



Solus:  $x = -2, 1, 1$   
 factors:  $(x+2)(x-1)(x-1)$

$$f(x) = k(x+2)(x-1)(x-1)$$

$$f(0) = k(0+2)(0-1)(0-1) = 4$$

$$\Rightarrow k(2)(-1)(-1) = 4$$

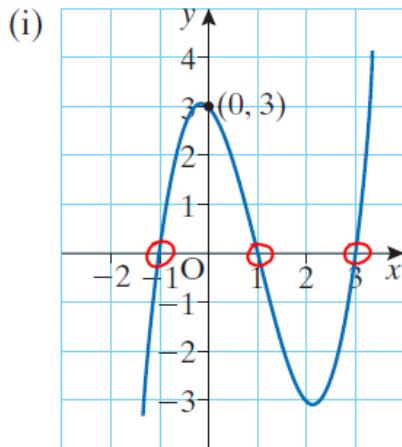
$$\Rightarrow 2k = 4 \Rightarrow k = \frac{4}{2} = 2$$

$$f(x) = 2(x+2)(x-1)(x-1)$$

$$\text{expand: } f(x) = 2x^3 - 6x + 4 = 0$$

## Exercise 2.10

1. Find a cubic expression for each of the following graphs, giving your answers in the form  $f(x) = ax^3 + bx^2 + cx + d$ .



Roots:  $x = -1, 1, 3$

Factors:  $(x+1)(x-1)(x-3)$

Function:  $f(x) = k(x+1)(x-1)(x-3)$

$k = ?$  use pt.  $(0, 3) \Rightarrow$

$$f(0) = k(0+1)(0-1)(0-3) = 3$$

$$\Rightarrow k(1)(-1)(-3) = 3$$

$$3k = 3 \Rightarrow k = 1$$

Function  $f(x) = 1(x+1)(x-1)(x-3)$

$$= (x^2 - x + x - 1)(x-3)$$

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

(expand)

$$f(x) = x^3 - 3x^2 - x + 3$$