Alg2

April 11, 2012

Get out your homework - pg 491

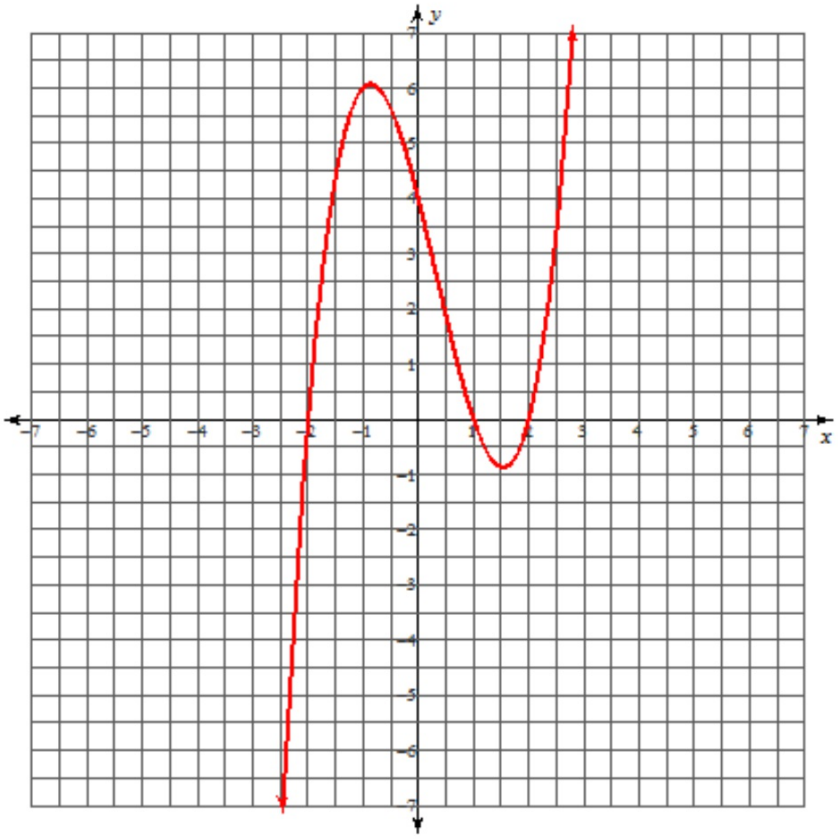
4/11 - Connections: Zeros, Factors and Solutions

$$f(x) = x^3 - x^2 - 4x + 4$$

$$= x^2(x-1) - 4(x-1)$$

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

Zeros	Factors	Solutions	x-intercepts
1	$(x-1)$	1	$(1,0)$
2	$(x-2)$	2	$(2,0)$
-2	$(x+2)$	-2	$(-2,0)$


y
x
−7
−6
−5
−4
−3
−2
−1
1
2
3
4
5
6
7

Decide if the given x-value is a zero of the function.

$$f(x) = x^5 + x^3 + 2x^2 - 12x + 8, \quad x = 2i$$

$2i$	1	0	1	2	-12	8
		$2i$	-4	$-6i$	$12+4i$	-8
	1	$2i$	-3	$2-6i$	$4i$	0

yes, because it will make $f(x) = 0$.

$2i(2-6i)$

$= 4i - 12i^2$

$= 12 + 4i$

Write the polynomial function that has the given zeros and has a leading coefficient of 1.

$$-2, 3, -1$$

$x = -2$, $x = 3$, $x = -1$

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

$= (x^2 - 3x + 2x - 6)(x+1)$

$= (x^2 - x - 6)(x+1)$

$= x^3 + x^2 - 6x + x^2 - x - 6$

$= x^3 - 7x - 6$

$$2i, -2i, 1, -3$$

$$(x-2i)(x+2i)(x-1)(x+3)$$

$$=(x^2+2ix-2ix+4)(x^2+3x-x-3)$$

$$=(x^2+4)(x^2+2x-3)$$

$$=x^4+2x^3-3x^2+4x^2+8x-12$$

$$=x^4+2x^3+x^2+8x-12$$

Write a polynomial function whose graph has the given x-intercepts and has a leading coefficient of 1.

$$(-3,0),\ (4,0)$$

$$(x+3)(x-4)$$

$$= x^2-4x+3x-12$$

$$= x^2-x-12$$

Write the polynomial as a product of linear factors.

$$f(x) = x^3 - 15x^2 + 27x - 13$$

	1	-15	27	-13
1	1	-14	13	0

$x^2 - 14x + 13$

$= (x-13)(x-1)$

$f(x) = (x-13)(x-1)(x-1)$

or

$f(x) = (x-13)(x-1)^2$

$$f(x) = x^4 + 4x^3 + 5x^2 + 20x$$

$$f(x) = x(x^3 + 4x^2 + 5x + 20)$$

	1	4	5	20
-4	1	0	5	0

← all the same sign means an upper limit

$$x^2 + 5 = 0$$

$$\sqrt{x^2} = \pm\sqrt{-5}$$

$$x = \pm i\sqrt{5}$$

$$f(x) = x(x+4)(x - i\sqrt{5})(x + i\sqrt{5})$$

Homework

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Due **Thursday**