Quiz Tomorrow!

Writing Equations of Polynomial Functions

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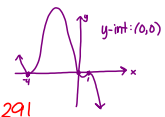
16.

z	m	T/C
-4	2	T
0	1	C
1	2	T



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14. $Q(x) = x^2 + 2x + 1$

$R(x) = 12$

$x^2+2x+1+\frac{12}{x-2}$

2 | 1 0 -3 10

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51. $\frac{p}{q} = \pm 8, \pm 4, \pm 1, \pm\frac{1}{2}, \pm 2$

52. $\frac{p}{q} = \pm 1, \pm 3, \pm 9, \pm\frac{1}{3}$

55. $\{-3, \pm\sqrt{2}\}$

$f(x) = (x+3)(x+\sqrt{2})(x-\sqrt{2})$ $x^2-2=0$

56. $\{1, \pm\sqrt{3}\}$

$f(x) = (x-1)(x+\sqrt{3})(x-\sqrt{3})$ $x^2-3=0$

58 $\{-2, 1\pm i\}$

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

OR $(x-(1+i))(x-(1-i))$

$f(x) = (x+2)(x-1-i)(x-1+i)$ $x^2-2x+2=0$

$x^2-2x+1 = -2+1$

$\sqrt{(x-1)^2} = \sqrt{-1}$

$x-1 = \pm i$

$x = 1 \pm i$

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$h(x) = x(x-4)(x+1)(x-2)$

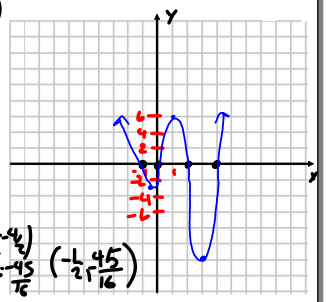
(1) (a) 4 (b) 4 (c) 3

R	m	T/C
-1	1	C
0	2	C
2	1	C
4		C

$h(-\frac{1}{2}) = (-\frac{1}{2})(-\frac{1}{2}-4)(-\frac{1}{2}+1)(-\frac{1}{2}-2) = \frac{-45}{16}$ $(-\frac{1}{2}, \frac{45}{16})$

$h(1) = 6$ $(1, 6)$

$h(3) = -12$ $(3, -12)$



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Oct 24-9:35 AM

Write a polynomial function with the given numbers as zeros

- Write out
- Multiply out

1. -2, 4

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

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

$f(x) = x^2 - 2x - 8$

2. -1, 2, 5

$P(x) = (x+1)(x-2)(x-5)$

$= (x^2 - x - 2)(x-5)$

$= x^3 - x^2 - 2x - 5x^2 + 5x + 10$

$P(x) = x^3 - 6x^2 + 3x + 10$

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Complex roots occur in conjugate pairs.

ie If a complex number a + bi, b ≠ 0, is a zero of a function f(x) with real coefficients then its conjugate, a – bi, is also a zero.

$3+5i \longrightarrow 3-5i$ $-3i \longrightarrow 3i$

Irrational zeros also occur in conjugate pairs.

$2-\sqrt{5} \longrightarrow 2+\sqrt{5}$ $\sqrt{2} \longrightarrow -\sqrt{2}$

Using Sum/Product Method to write equations.

$x^2 + bx + c = 0$

a = 1

b = -sum of roots $-(r_1 + r_2)$

c = product of roots $r_1 \cdot r_2$

(1) Find the equation for the conjugate pair

(2) Multiply by the other linear factors (pairs)

(3) Function $P(x) =$ _____

Equation _____ $= 0$

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Find a polynomial function of lowest degree with rational coefficients that has the given numbers as some of its zeros.

1. 1, 1 + i

$P(x)$:

$(x-1)$ $\quad 1-i$

(1) $a = 1$

$b = -(1+i+1-i)$

$= -2$

$c = (1+i)(1-i)$

$= 1-i^2 = 2$

x^2-2x+2

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

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

2. $0, 2, 2-\sqrt{5}, 2+\sqrt{5}$

$x \quad (x-2)$

$a = 1$

$b = -(2-\sqrt{5}+2+\sqrt{5})$

$= -4$

$c = (2-\sqrt{5})(2+\sqrt{5})$

$= 4-5 = -1$

x^2-4x-1

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

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

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Oct 24-11:16 AM

3. $-\sqrt{2}, 3i$

$\sqrt{2} \quad -3i$

$a = 1$

$b = -(\sqrt{2}+-\sqrt{2}) = 0$

$c = (-\sqrt{2})(\sqrt{2})$

$= -2$

x^2-2

$a = 1$

$b = -(3i+-3i) = 0$

$c = (3i)(-3i)$

$= -9i^2 = 9$

x^2+9

$P(x) = (x^2-2)(x^2+9)$

$P(x) = x^4+7x^2-18$

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Homework:
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QUIZ TOMORROW - NO Calculator!
Synthetic division
End behavior
Sketch Graph - with all components used in notes
Possible Rational Zeros

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