Alg2

April 9, 2012

Get out your notes...

4/9 - Remainer Theorem and Factor Theorem

Evaluate each function at the given value.

$$f(x) = x^3 - 6x^2 + 11x - 6 \text{ at } x = 3$$

$(x-3)$

Remainder Theorem: If a polynomial f(x) is divided by (x-k), then the remainder is r = f(k).

$$\begin{array}{r|rrrr} 3 & 1 & -6 & 11 & -6 \\ & & 3 & -9 & 6 \\ \hline & 1 & -3 & 2 & 0 \end{array} = f(3)$$

$$f(x) = x^4 + 2x^3 - x^2 - x + 1 \quad \text{at } x = -2$$

$$\begin{array}{r|rrrrr} -2 & 1 & 2 & -1 & -1 & 1 \\ & & -2 & 0 & 2 & -2 \\ \hline & 1 & 0 & -1 & 1 & -1 \end{array} = f(-2)$$

$$f(x) = -3x^3 - 15x^2 - 14x - 1 \quad \text{at } x = -4$$

$$\begin{array}{r|rrrr} -4 & -3 & -15 & -14 & -1 \\ & & 12 & 12 & 8 \\ \hline & -3 & -3 & -2 & 7 \end{array} = f(-4)$$

← 3 factors

$$3x^3 + 8x^2 - 45x - 50 = (x+5)(?)(?)$$

Factor Theorem: a polynomial f(x) has a factor (x-k) if and only if f(k) = 0.

$f(-5) \stackrel{?}{=} 0$

-5	3	8	-45	-50
		-15	35	50
	3	-7	-10	0

$3x^2 - 7x - 10$

$= (3x - 10)(x + 1)$

$-10x$

$+3x$

$$x^3 + 18x^2 + 80x + 96 = (x+2)(?)(?)$$

-2	1	18	80	96
		-2	-32	-96
	1	16	48	0

$$x^2 + 16x + 48$$
$$= (x+12)(x+4)$$

$(x+12), (x+4)$

$$2x^3 + 6x^2 - 8 = (x-1)(?)(?)\ ?$$

$$\begin{array}{r|rrrr} 1 & 2 & 6 & 0 & -8 \\ & & 2 & 8 & 8 \\ \hline & 2 & 8 & 8 & 0 \end{array}$$

$$2x^2 + 8x + 8$$
$$= 2(x^2 + 4x + 4)$$
$$= 2(x+2)(x+2)$$

$$2x^2 + 8x + 8$$
$$= (2x+4)(x+2)$$

Homework

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Due