

## 8-1 Dividing Polynomials

### Objectives:

**\*\*8-1a: I can divide polynomials using synthetic division.\*\***

8-1b: I can determine if a polynomial is a factor of another using division.

May 31-3:15 PM

### Synthetic Division (only with linear divisor)

- 1) Find the "zero" of the divisor.
- 2) Identify the coefficients of the dividend.
- 3) Set up 3 rows for synthetic division.
- 4) Add vertically and multiply diagonally.
- 5) Write quotient using new coefficients.

$$(3x^4 - 20x^3 + 27x^2 - 9x + 3) \div (x - 5)$$

Aug 11-10:36 AM

$$(x^3 + 3x^2 - 4x - 12) \div (x + 3)$$

Synthetic Division

$$(x^3 + 3x^2 - 4x - 12) \div (x + 3)$$

$x + 3 = 0$   
 $x = -3$

-3	1	3	-4	-12	
		-3	0	12	
	1	0	-4	0	← Remainder

$x^2 + 0x - 4$

$x^2 - 4$

Aug 11-10:30 AM

$$(2x^5 - 14x^4 + 5x^3 + 6x^2 - 5x + 16) \div (x - 1)$$

$x - 1 = 0$   
 $x = 1$

1	2	-14	5	6	-5	16	
		2	-12	-7	-1	-6	
	2	-12	-7	-1	-6	10	← Remainder

$2x^4 - 12x^3 - 7x^2 - x - 6 + \frac{10}{x-1}$

Aug 11-11:06 AM

$$\textcircled{A} \quad (7x^3 - 6x + 9) \div (x + 5)$$

$$\begin{array}{r} -5 \overline{) 7 \quad 0 \quad -6 \quad 9} \\ \underline{-35 \quad 175 \quad -845} \end{array}$$

$$\underline{7 \quad -35 \quad 169 \quad -836}$$

$$7x^2 - 35x + 169 - \frac{836}{x+5}$$

Feb 6-11:47 AM

What does it mean for a number to be a factor of another number?

factors of 12

$$6 \cdot 2 = 12$$

$$3 \cdot 4$$

$$1 \cdot 12$$

How do you tell if a number is a factor?

No Remainder!!!

Determine if  $d(x)$  is a factor of  $f(x)$ .

$$2) f(x) = 4x^2 - 18x + 8$$

$$d(x) = x - 4$$

$$4x^2 - 18x + 8 \div x - 4$$

$$\begin{array}{r} 4 \overline{) 4 \quad -18 \quad 8} \\ \underline{4 \quad -16 \quad -8} \phantom{0} \\ 4 \quad -2 \quad 0 \end{array}$$

Yes  $d(x)$  is a factor of  $f(x)$

Feb 6-11:48 AM

Determine if  $d(x)$  is a factor of  $f(x)$ .

$$2) f(x) = 5x^5 - 30x^4 + x^3 - 7x^2 + 8x$$

$$d(x) = x - 6$$

$$\begin{array}{r} 6 \overline{) 5 \quad -30 \quad 1 \quad -7 \quad 8 \quad 0} \\ \underline{30 \quad 0 \quad 6 \quad -6 \quad 12} \phantom{0} \\ 5 \quad 0 \quad 1 \quad -1 \quad 2 \quad 12 \end{array}$$

$$5x^4 + x^2 - x + 2 + \frac{12}{x-6}$$

Not a factor

Feb 6-11:49 AM

