

Precalculus Section 2.3  
 What questions do you have from 2.2 (due Thursday)? 91

$(36-2x)(36-2x)x$   
 $x(36-2x)^2$

Jan 16-8:44 AM

????????????s 2.2

Jan 14-10:11 AM

Strategy for long division:  
 (1) Arrange all terms in descending order.  
 (2) Put a 0 coefficient in for any missing term(s).  
 (3) How many times will divisor go into polynomial?  
 (4) mult divisor and #  
 (5) Subtract from polynomial  
 (6) Bring down following terms  
 (7) Repeat until remainder can no longer be divided.

4 | 528  
-4
 12 |  
 -12 |  
 ---  
 08 |  
-08
 0

Feb 14-10:46 AM

Example | p. 127 #8  
 Divide:  $8x^4 - 5$  by  $2x+1$

$4x^3 - 2x^2 + x - \frac{1}{2} - \frac{4.5}{2x+1}$

Jan 16-8:56 AM

**Example** | p. 127 #10

Divide:  $1+3x^2+x^4$  by  $3-2x+x^2$

$$\begin{array}{r} x^2+2x+4 + \frac{2x-11}{x^2-2x+3} \\ x^2-2x+3 \overline{) x^4+0x^3+3x^2+0x+1} \\ \underline{-x^4+2x^3+3x^2} \phantom{+0x+1} \\ 2x^3+0x^2+0x+1 \\ \underline{-2x^3+4x^2+6x} \\ 4x^2-6x+1 \\ \underline{-4x^2+8x+12} \\ 2x-11 \end{array}$$

p. 127, #9 (HW)

Jan 16-8:56 AM

**Synthetic Division**

Consider  $x^3+4x^2-5x+5 \div x-3$ .  $x-3=0$   
 $x=3$

$$\begin{array}{r|rrrr} 3 & 1 & 4 & -5 & 5 \\ & & 3 & 21 & 48 \\ \hline & 1 & 7 & 16 & 53 \end{array}$$

remainder

$$x^2+7x+16 + \frac{53}{x-3}$$

Feb 14-10:51 AM

**Steps for synthetic division:**

- (1) Arrange the polynomial in descending order, with a 0 coefficient for any missing term.
- (2) Write C for the divisor  $x-c$ . To the right write the coefficients of the dividend.
- (3) Bring down the 1st coefficient to the bottom row.
- (4) mult by c and put in next column
- (5) add going down
- (6) Keep executing Steps 4 & 5 until you can't go anymore.

**Q:** Since we are dividing by a linear factor  $(x-c)$ , what will our remainder look like?

**A:**  $\frac{\text{remainder}}{x-c}$

Feb 14-10:52 AM

**Example**

Divide  $x^3-7x-6$  by  $x+2$  using synthetic division.

$$\begin{array}{r|rrrr} -2 & 1 & 0 & -7 & -6 \\ & & -2 & 4 & 6 \\ \hline & 1 & -2 & -3 & 0 \end{array}$$

$x^2-2x-3$

p. 127, #15 (HW)

Feb 14-10:53 AM

$$\frac{6x^3 + 41x^2 - 9x - 14}{2x+1}$$

$$\begin{array}{r} 3x^2 + 19x - 14 \\ 2x+1 \overline{) 6x^3 + 41x^2 - 9x - 14} \\ \underline{-6x^3 + 3x^2} \phantom{-14} \\ 38x^2 - 9x - 14 \\ \underline{-38x^2 + 19x} \phantom{-14} \\ -28x - 14 \\ \underline{+28x + 14} \\ 0 \end{array}$$

$2x+1=0$   
 $2x=-1$   
 $x=-\frac{1}{2}$

$$-\frac{1}{2} \overline{) 6 \quad 41 \quad -9 \quad -14}$$

$$\underline{-3 \quad -19 \quad 14}$$

$$\frac{6}{2} \quad \frac{38}{2} \quad \frac{-28}{2} \quad 0$$

$$3x^2 + 19x - 14$$

Jan 16-9:03 AM

# HOMEWORK

...due Thursday, along with 2.3b


2.3a (p. 127): 3, 9, 11, 15, 17, 19, 23

Don't forget: 2.1, 2.2, 2.3a, 2.3b due Thursday!!!!

Jan 16-9:03 AM

**Here's what's happening the rest of this week...**

**Today:** Finish 2.3  
**Tomorrow:** Review for Quiz  
**Friday:** Quiz (2.1-2.3)



Jan 16-9:08 AM

**Questions from homework (2.3a)?**

Jan 17-2:58 PM

**TRUE or FALSE:** 6 is a factor of 12.

Why or why not?

\*\*A polynomial  $f(x)$  has a **factor**  $(x-k)$  if and only if  $k$  is a zero of  $f(x)$  [ $f(k)=0$ ].

If we want to show that  $(x-2)$  is a factor of  $f(x)$ , we can show that \_\_\_\_\_ is a \_\_\_\_\_.

If want to show that  $x=-5$  is a zero of  $f(x)$ , we can show that \_\_\_\_\_ is a \_\_\_\_\_.

**Example** | p. 128 #40

**a) Show  $x=-4$  is a solution to  $x^2 - 28x - 48 = 0$ .**

**b) Use the result to factor the polynomial completely.**

**c) List all the real zeros of the function.**

p. 128, #39 (HW)

Jan 17-2:59 PM

Jan 17-3:05 PM

**Example** | p. 128 #44

**a) Verify  $(x+3)$  is a factor of  $f(x)=3x^3 + 2x^2 - 19x + 6$**

**b) Write the complete factorization of  $f(x)$ .**

**c) List all real zeros of  $f(x)$ .**

p. 128, #43 (HW)

#### Rational Zero Test

If a polynomial has **integer** coefficients, every **rational** zero has the form \_\_\_\_\_ where  $p$  is a factor of the \_\_\_\_\_ term and  $q$  is a factor of the \_\_\_\_\_.

**Example**  $f(x) = 4x^5 - 8x^4 - 5x^3 + 10x^2 + x - 2$

p's:

q's:

**Possible rational zeros:**

p. 128, #49 (HW)

Jan 17-3:05 PM

Jan 17-3:33 PM

Try #53 (HW). You can narrow down your real zeros by using the Rational Zero Test...

$$f(z) = z^4 - z^3 - 2z - 4$$

# HOMWORK

...we <3 algebra.

2.3 (p. 127)

{Part a (Tuesday's): 3, 9, 11, 15, 17, 19, 23}

Part b (today's): 39, 41, 43, 45, 49, 53, 57, 61

Jan 17-3:37 PM

Jan 16-9:03 AM

Day	Date	Section	Title	Assignment	Topics
M	01/07	9.5	Parametric Equations	p704 1-5 odd, 11-21 odd, 35, 36, 39, 49	x&y as a function of t eliminate the parameter
T	01/08	9.5	Parametric Equations	Parametric Packet Due 1/11	Bug Races!
W	01/09	9.5	Work Day	Work Day	Work Day
Th	01/10	9.6	Polar Coordinates	p711 1-17 eoo, 21, 23, 31, 33, 37, 39, 43-49 odd, 61, 65, 69	r and theta; plot points conversion of coord. and eq.
F	01/11	9.7	Graphs of Polar Eq	p720 13, 15, 16, 19, 21, 23, 24, 25, 26, 37, 38, 53, 54 Pass out Polar Art Project Due 1/15	table of values; symm.; D&R; zeros & max; special graphs
M	01/14	9.5-9.7	Review	p732 69,85,86,99,105,113,115, 117,125,131,133,137,139,143	
T	01/15	9.5-9.7	Review	Go over review assignment	
W	01/16	9.5-9.7	Test	Parametric & Polar Equations	
Th	01/17	2.2	Polynomial Functions	p112 1-8, 15, 17, 23, 29, 37, 39, 41, 51, 67, 69, 73, 91; p100 29-33 (then find where f(x)<0) and 59	Continuous; Parent functions; Transf., Leading coeff., quad max
F	01/18	2.3	Real Zeros	p127 3, 9, 11, 15, 17, 19, 23	Long Div., Synth. Div.

Jan 21-5:18 PM