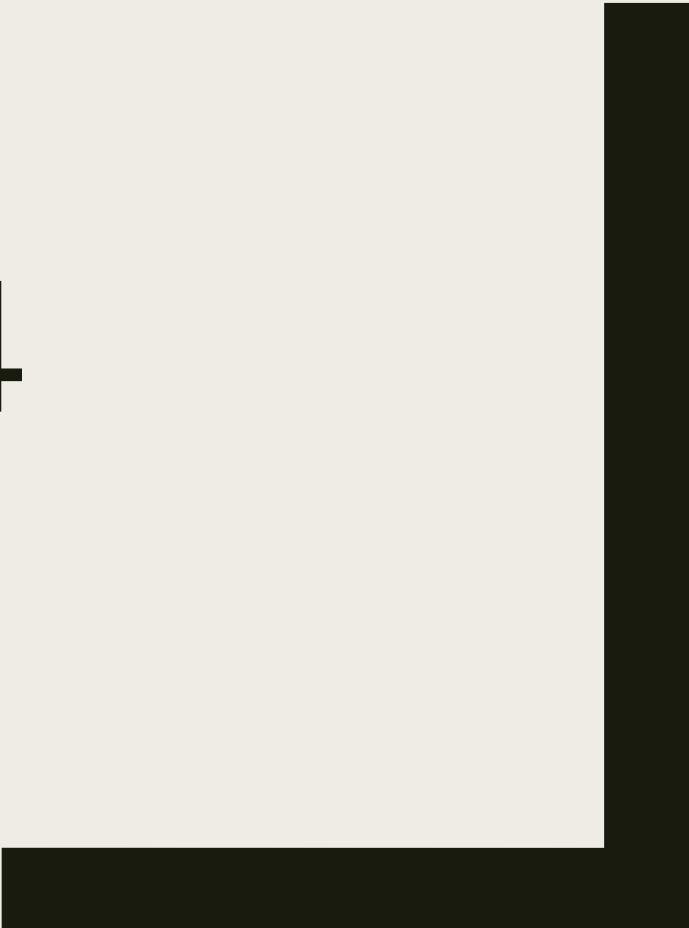




ALGEBRA 4

Day 47



Bell Work

In the standard (x,y) coordinate plane below, 3 of the vertices of a rectangle are shown. Which of the following is the 4th vertex of the rectangle?

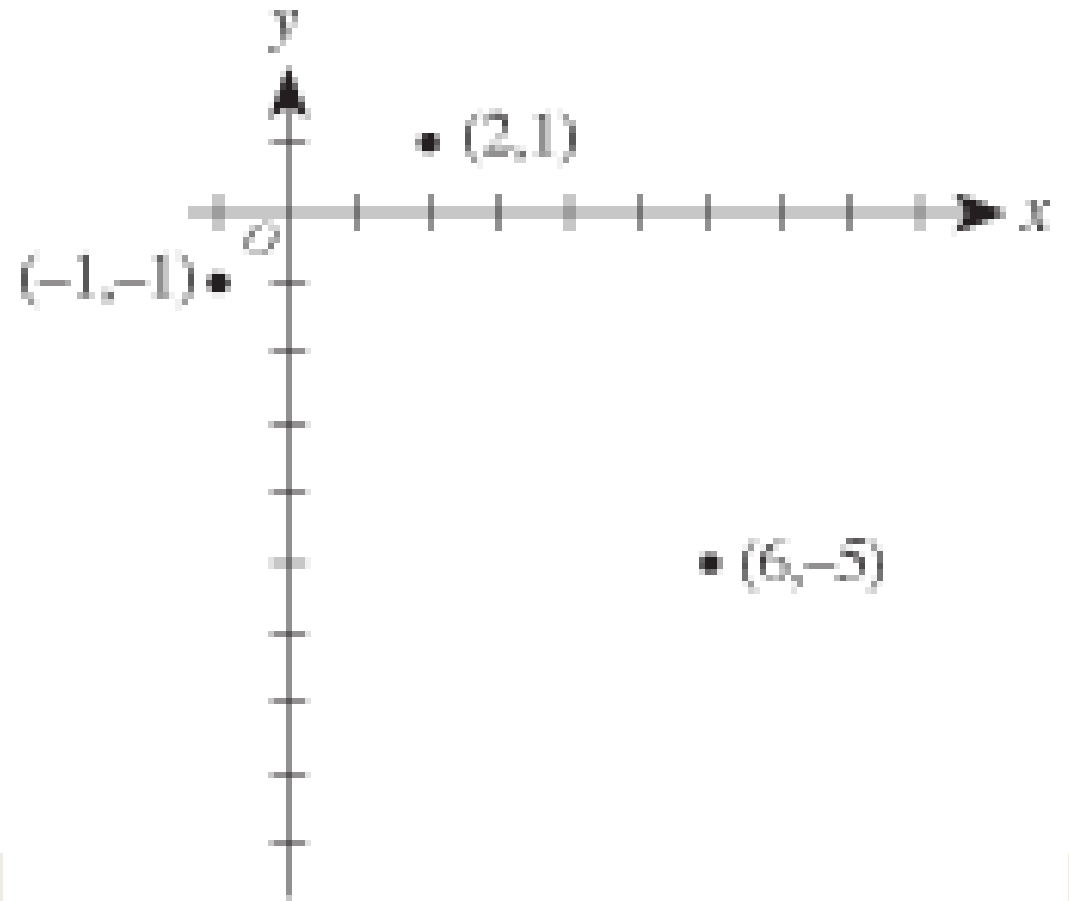
F. $(3,-7)$

G. $(4,-8)$

H. $(5,-1)$

I. $(8,-3)$

J. $(9,-3)$



From Last Time (need time to work)

page 300 #1-9, 17, 25-31 (odd), 37, 51-52

5.4 Dividing Polynomials

Objectives:

- To Divide Polynomials Using Synthetic Division.
- To know that Long Division exists.

To Divide Polynomials:

- Write polynomial in standard form
- Put 0's in for missing parts

You have to remember 0's as place holders!!!!

Long Division

- Allows you to divide any polynomial by another polynomial
- The process is long, thus the name, and we have better options
- If you want to see it... I can show you another time! 😊

Synthetic Division: simplifies long-division by dividing by a linear expression $x - a$

Steps to using Polynomial Synthetic Division:

- Write the equation in standard form
- (put 0's in for exponents not represented)
- Multiply leading coefficient by the value of the variable
- Sum the next coefficient with the answer from Step 2
- Multiply the answer from Step 3 by the value of the variable
- Sum the next coefficient with the answer from Step 4
- Continue until each coefficient has been used

Example:

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

Example:

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

$$\begin{array}{r} 2x^4 + 0x^3 - 8x^2 + 5x - 7 \\ \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\ 2 \quad 0 \quad -8 \quad 5 \quad -7 \\ 3 \downarrow \quad \nearrow \quad \nearrow \quad \nearrow \quad \nearrow \\ \hline 2 \quad 6 \quad 18 \quad 30 \quad 105 \\ \hline 2 \quad 6 \quad 10 \quad 35 \quad 98 \end{array}$$

$$2x^4 - 8x^2 + 5x - 7 = (2x^3 + 6x^2 + 10x + 35)(x - 3) + \mathbf{R: 98}$$

Remainder Theorem;

If a polynomial $f(x)$ is divided by $x - k$, then the remainder is $r = f(k)$

Based on the last problem...

By the Remainder Theorem, $f(3)$ is the remainder when you divide $f(x)$ by $x - 3$

$$f(3) = 98$$

Is $(x+5)$ a factor of $x^3 + 7x^2 - 38x - 240$?
If yes, what are the other factors? If no,
what is the remainder?

Is $(x+5)$ a factor of $x^3 + 7x^2 - 38x - 240$?
If yes, what are the other factors? If no,
what is the remainder?

- Since you get a remainder of 0 when doing synthetic division, then $(x+5)$ is a factor
- The other factors are $(x+8)$ and $(x-6)$
- Therefore, $x^3 + 7x^2 - 38x - 240 = (x+5)(x+8)(x-6)$

For Next Time

Page 308 #1-7, 11-25 (odd), 29, 33-37
(odd), 41

(Extra Practice #44-62)