Review....

Every Monday at noon in AD229
at 4:30 in ET217

Today.... Chapter 4.1/4.2 5.7 5.8
Systems of equations

Graph is a collection of points on plotted on axis

Graph of a line= collection of all points that make the equation of the line true

Ex: \( y = 2x + 1 \) (3,7) (0,1) (9,14)
system of equations:

2 equations: 3 possibilities

1. Intersect
   \[ y = 2x + 1 \quad x - 2y = 7 \]

2. Parallel
   \[ y = 2x \quad y = 2x + 2 \]

3. Coincidental
   \[ x + y = 1 \quad 2x + 2y = 2 \]

To solve...use

Method: Substitution

\[ y = 2x + 1 \]
\[ 3x - y = 7 \]
\[ 3x - (2x + 1) = 7 \]
\[ 3x - 2x - 1 = 7 \]
\[ x = 8 \]

\[ y = 2x + 1 \]
\[ y = 2(8) + 1 \]
\[ y = 17 \]
Elimination

\[ x + y = 7 \]
\[ 2x - y = 2 \]

Add together to get

\[ 3x = 9 \]
\[ x = 3 \]

\[ 3 + y = 7 \]
\[ y = 4 \]

\[ 3x - 2y = -1 \]
\[ 2x + 5y = 12 \]

Multiply by 5

\[ 15x - 10y = -5 \]
\[ 4x + 10y = 24 \]

Multiply by 2

\[ 30x - 20y = -10 \]
\[ 8x + 20y = 48 \]

\[ 38x = 38 \]
\[ x = 1 \]

\[ 3 - 2y = -1 \]
\[ -3 -3 \]
\[ -2y = -4 \]
\[ y = 2 \]
\[ 3x - 2y = 4 \]
\[ -3x + 2y = 1 \]

\[ 0 = 5 \text{ never true} \]
\[ \text{inconsistent} \]
\[ \text{lines are parallel} \]

\[ \text{if } 0 = 0 \text{ always true} \]
\[ \text{consistent} \]
\[ \text{coincidal} \]

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**Section 4.1 Systems - Question #3;**
Graphically solving a system of linear equations

Graph the system below and write its solution.

\[ \begin{cases} 
    y = \frac{1}{3}x + 2 \\
    -3x + y = -6
\end{cases} \]

Note that you can also answer "No solution" or "Infinitely many solutions."
Solve the following system of equations.

\[
\begin{align*}
6x + 5y &= -15 \\
3x + 4y &= -12
\end{align*}
\]

\[18x + 15y = -45\]
\[-18x - 24y = 72\]

Section 4.1 Systems - Question #8;
Solving a word problem involving a sum and another basic relationship using a system of linear equations

A textbook store sold a combined total of 472 sociology and psychology textbooks in a week. The number of psychology textbooks sold was 56 less than the number of sociology textbooks sold. How many textbooks of each type were sold?

\[x = \text{soc} \quad y = \text{psy}\]

\[x + y = 472\]

\[y = x - 56\]

\[x + x - 56 = 472\] then solve
Section 4.1 Systems - Question #13:
Interpreting the graphs of two functions

Milan can choose Plan A or Plan B for his long distance charges. For each plan, cost (in dollars) depends on minutes used (per month) as shown below.

![Graph of Plan A and Plan B costs against minutes used.]
1. Factor $9y^2 - 15y^3$.
   $3y^2(3 - 5y)$

2. Factor the following expression.
   $2uw^7 (13uw^2 - 7x^6)$

3. Rewrite the expression by factoring out $(v+4)$.
   $5v^2(v+4) + 2(v+4)
   (v + 4)(5v^2 + 2)$

4. Factor by grouping.
   $4w^3 + 5w^2 + 12w + 15$
   $w^2(4w + 5) + 3(4w + 5)$
   $(4w + 5)(w^2 + 3)$

5. Factor by grouping.
   $3y^3 + 5y^2 - 6y - 10$
   $y^2(3y + 5) - 2(3y + 5)$
   $(3y + 5)(y^2 - 2)$
6. Factor by grouping.

\[ \frac{u \cdot w + 5 \cdot w - 7 \cdot u - 35}{w(u+5) - 7( \ u + 5) - (u + 5)(w - 7)} \]

7. Factor.

\[ z^2 - 9z + 18 \]

\[ (z - 6)(z - 3) \]

18 < -6

-3

-9

8. Factor.

\[ x^2 + 6xy - 16y^2 \]

\[ (x + 8y)(x - 2y) \]

\[ -16y^2 \leq \frac{8y}{-2y} \]

\[ \frac{6y}{6y} \]


\[ 8y^2 - 6y - 72 \]

\[ b(y^2 - y + 12) \]
14. Factor:

\[ 2x^2 + 9xy - 18y^2 \]

AC = 2*-18yy = -36y^2

\[
\begin{array}{c}
12y \\
-3y \\
9y
\end{array}
\]

\[ 2x^2 + 12xy - 3xy - 18y^2 \]

\[ 2x(x + 6y) - 3y(x + 6y) \]

\[ (x + 6y)(2x - 3y) \]

difference of squares

(7 - 3w)(7 + 3w)

conjugates

FOIL ----> FL