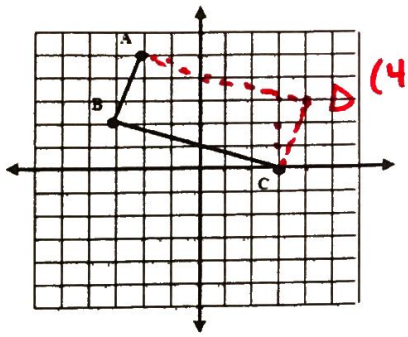
Units 5, 6, and 7 Exam Review
Systems of Linear Equations



Vocabulary

→ Trapezoid, Parallelogram, Rectangle, Rhombus, Square

Formulas

→ Slope $\frac{y_1 - y_2}{x_1 - x_2}$

→ Distance $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

→ Midpoint $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

Parallel & Perpendicular Lines

→ If parallel, both lines have the SAME slope

→ If perpendicular, lines have OPPOSITE (positive/negative) RECIPROCAL (flipped form) slopes

→ If given a point and a line, use the slope from the line and the x-value and y-value from the point to solve for the y-intercept

$(6, -7), y = -\frac{3}{2}x - 4$

Solving by Graphing (or finding "Break Even" point)

→ Both equations must be in slope-intercept form to graph ($y = mx + b$)

→ Enter both equations as *y=* into the calculator, then graph

→ Press 2nd CALC (above Trace) → 5:intersection → Enter 3 times

→ The point (x, y) of intersection is the solution!

(5,2)

$\begin{cases} y = 7 - x \\ 2x - y = 8 \end{cases}$

$-2x \quad -2x$

$-y = -2x + 8$

$\frac{-y}{-1} = \frac{-2x}{-1} + \frac{8}{-1}$

$y = 2x - 8$

Remember, if both lines have the same slope and different y-intercepts, then they are PARALLEL lines and have NO SOLUTION. If both lines have the same slope and the same y-intercept, then they are the SAME line and have INFINITELY MANY SOLUTIONS (all points on the line)

Solving by Substitution

→ Solve one equation for one of the variables and plug that expression into the other equation, then solve for the remaining variable

→ Enter the solution value into the first equation and solve for the other variable.

→ Write answer as an ordered pair (x, y)

$\begin{cases} 3x + y = 6 \\ x = y + 2 \end{cases}$

$3(y+2) + y = 6$

$3y + 6 + y = 6$

$4y = 0$

$y = 0$

$x = 0 + 2 = 2$

(2,0)

Solving by Elimination

→ Stack the equations on top of each other.

→ Decide if you must multiply one or both equations to create opposite values for one of the variables. One must be negative and one must be positive to cancel out!!!

→ Add the equations together and solve for one variable, then plug that value into either equation and solve for the other variable.

→ Write your answer as an ordered pair (x, y)

$-2(x - 5y = 10)$

$\begin{cases} -2x + 10y = -20 \\ 2x - 10y = 20 \end{cases}$

$0 = 0$

Infinitely many Solutions

Remember, if *x and y cancel out* so that you are left with a FALSE statement, there is NO SOLUTION.

If x and y cancel out so that you are left with a TRUE statement, there are INFINTELY MANY SOLUTIONS.

Check Solutions

→ To check a solution, remember to plug each order pair into both equations.

Word Problems

→ Define the variables. Tell what *x* and *y* represent.

→ Write two equations, then solve for both variables.

→ Answer the question you were asked in a complete sentence.

Graphing Inequalities

→ Get *y* by itself (remember to flip the inequality sign if you divide by a negative!)

→ Decide whether to draw a solid (≤ or ≥) or dotted line (< or >)

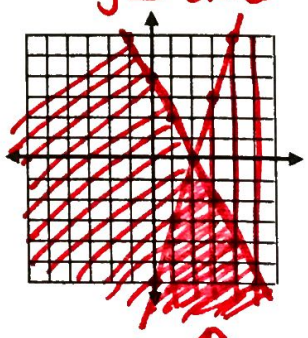
→ Shade up for greater than and down for less than

$\begin{cases} 2x + y \leq 4 \\ 3x - y \geq 6 \end{cases}$

$y \leq -2x + 4$

$y \leq 3x - 6$

$-y \geq -3x + 6$



(2,-3) is a solution