Cumulative Review Chapters 1-3 Name KEY

Ch 1: Solve Equations and Inequalities

Solve and graph the solution on a number line:

1. $-2 \le -3x + 5 < 14$

$-5 \quad -5 \quad -5$

$\frac{-7}{-3} \le \frac{-3x}{-3} < \frac{9}{-3}$

$\frac{7}{3} \ge x > -3$ (closed, open)

Flip the inequality! Divide or Multiply by a negative #

2. $3(x+7)+12 = -15 + x$

$3x + 21 + 12 = -15 + x$

$3x + 33 = -15 + x$

$-x \quad -x$

$2x + 33 = -15$

$-33 \quad -33$

$\frac{2x}{2} = \frac{-48}{2}$

$x = -24$

3. $4|x-9|+2 > 18$

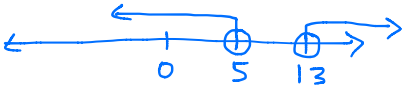
$-2 \quad -2$

$\frac{4|x-9|}{4} > \frac{16}{4}$

$|x-9| > 4$

$x-9 < -4 \quad +9 \quad +9$ OR $x-9 > 4 \quad +9 \quad +9$

$x < 5$ OR $x > 13$



Ch 1: Applications of Expressions, Equations, and Inequalities

4. To rent a car it costs $19.95 per day plus $.20 per mile. How many miles did you drive if the total cost for renting the car for one day is $56.25? m = miles

$19.95 + .20m = 56.25$ equation

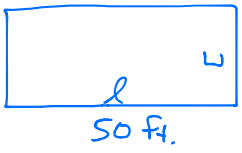
$-19.95 \quad -19.95$

$\frac{.20m}{.20} = \frac{36.30}{.20}$

$m = 181.5$

181.5 miles

5. The length of a rectangular yard is 50 feet and its perimeter is less than 170 feet. Describe the width of the yard. l = length, w = width



$2l + 2w$ = Perimeter

$2l + 2w < 170$

$2(50) + 2w < 170$

$100 + 2w < 170$

$-100 \quad -100$

$\frac{2w}{2} < \frac{70}{2}$

$w < 35$ ft.

Width must be less than 35 ft.

6. To start your own perfume business, you pay $500 in materials. It costs your business $4 to produce your each perfume bottle, and you sell your each bottle for $10 a piece. How many bottles must you sell to have a profit of at least $1000? b = bottles of perfume

$-500 \underbrace{-4b + 10b}_{\text{expense} \quad \text{expense} \quad \text{profit}} \ge 1000$

$-500 + 6b \ge 1000$ equation

$+500 \quad +500$

$\frac{6b}{6} \ge \frac{1500}{6}$

$b \ge 250$

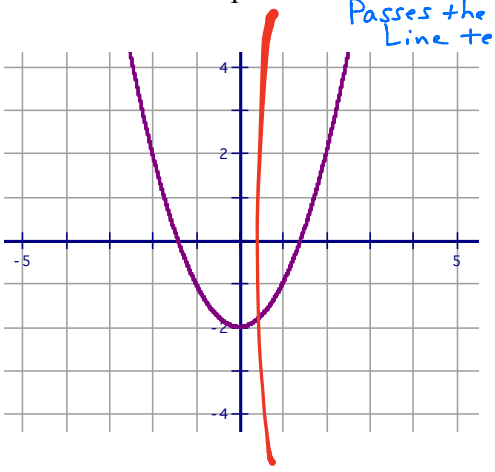
$b \ge 250$

You must sell at least 250 bottles

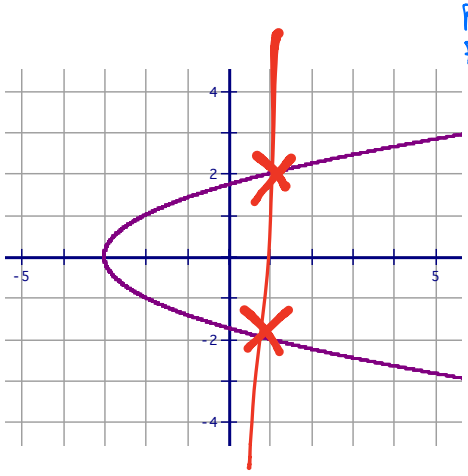
Ch 2: Functions

7. Is it a function? Explain.

a) Function. Passes the Vertical Line test.



b) Not a Function. Fails the Vertical Line test.



c) Function. Each input has exactly ONE unique output.

IN x	OUT y
2	5
3	6
4	6

d) Not a Function. An input of 7 cannot give 2 different outputs.

x	y
7	4
7	2
9	-3

8. If $f(x) = 2x - 5$ and $g(x) = -3x + 4$, find the following:

a) $f(3) = 2(3) - 5$
$= 6 - 5$
$= 1$

b) $g(-2) = -3(-2) + 4$
$= 6 + 4$
$= 10$

c) $f(-1) + g(3)$
$2(-1) - 5 \quad + \quad -3(3) + 4$
$-2 - 5 \quad + \quad -9 + 4$
$-7 \quad + \quad -5$
-12

Ch 2: Linear Functions, Graphs, and their Applications

9. Explain how to determine if 2 lines are parallel or perpendicular by looking only at the equations.

Parallel lines have the same slopes. $y = \frac{1}{2}x + 7$ $y = \frac{1}{2}x - 4$

Perp. lines have opposite reciprocal slopes. $y = \frac{1}{2}x + 7$ $y = -2x + 10$

10. Graph $3x - 4y = -12$. Find the slope, x-intercept, and y-intercept.

Option #1:

$3x - 4y = -12$

$-3x \quad -3x$

$\frac{-4y}{-4} = \frac{-3x}{-4} - \frac{12}{-4}$

$y = \frac{3}{4}x + 3$

slope "m": Up 3, Right 4

y-intercept "b": (0, 3)

Option #2:

x-int: $(-4, 0)$

$3x = -12$

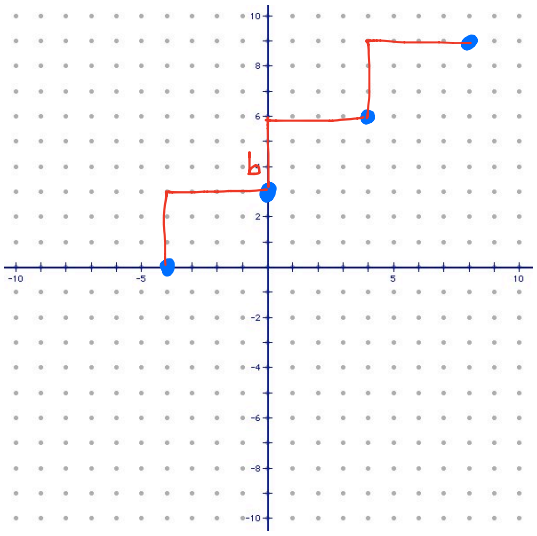
$x = -4$

y-int: $(0, 3)$

$\frac{-4y}{-4} = \frac{-12}{-4}$

$y = 3$

Slope is $\frac{3}{4}$



11. There were 174 words typed in 3 minutes. There were 348 words typed in 6 minutes.

a) Write the equation of the line (in all three forms) to represent the words typed in x minutes.

Point-Slope Form $y - 174 = 58(x - 3)$

Slope-Intercept Form $y = 58x$

Standard Form $-58x + y = 0$

(3 min, 174 words) (6 min, 348 words)

$m = \text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{348 - 174}{6 - 3} = \frac{174}{3} = 58$ words per minute

Pick a point: $(3, 174)$

$y - 174 = 58(x - 3)$

$y - 174 = 58x - 174$

$+174 \quad +174$

$y = 58x$

b) How many words will be typed in 15 minutes?

$y = 58(15)$

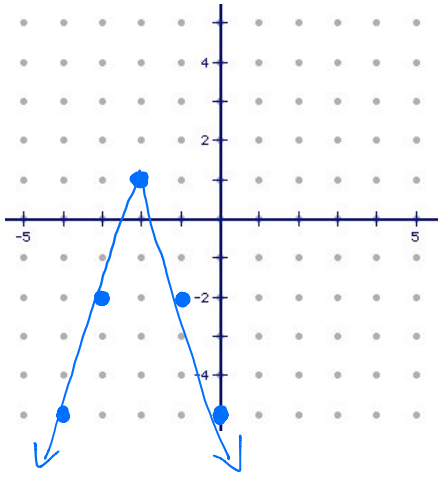
$y = 870$ words

Ch 2: Graph Equations and Inequalities.

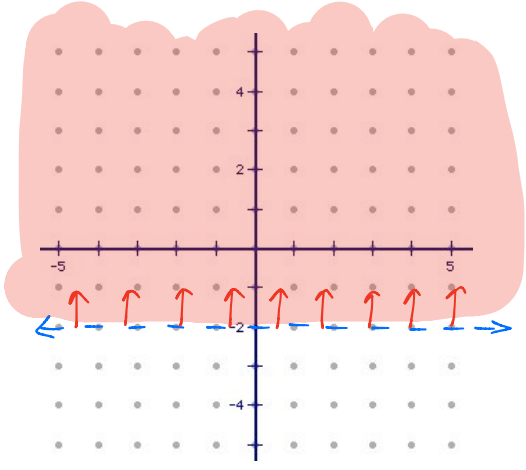
12. $y = -3|x + 2| + 1$

Vertex: $(-2, 1)$

Slope: -3



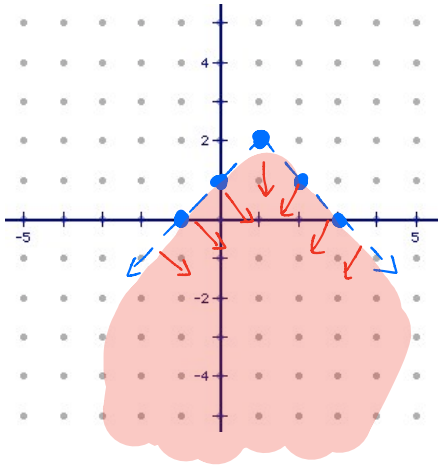
2. $y > -2$ (dashed)



3. $y < -|x - 1| + 2$ (dashed)

Vertex: $(1, 2)$

slope: -1



Ch 3: Solve systems of equations and inequalities

13. $\begin{cases} x + 2y = 10 \\ 3x - y = 9 \end{cases}$ Mult. by 2

$x + 2y = 10$

$+\ 6x - 2y = 18$

$7x = 28$

$x = 4$

$(4) + 2y = 10$

$-4 \quad -4$

$\frac{2y}{2} = \frac{6}{2}$

$y = 3$

One Solution: $(4, 3)$

INDEPENDENT SYSTEM

2. $\begin{cases} y = 3x - 4 \\ 2y - 6x = -8 \end{cases}$

$2(3x - 4) - 6x = -8$

$6x - 8 - 6x = -8$

$0x - 8 = -8$

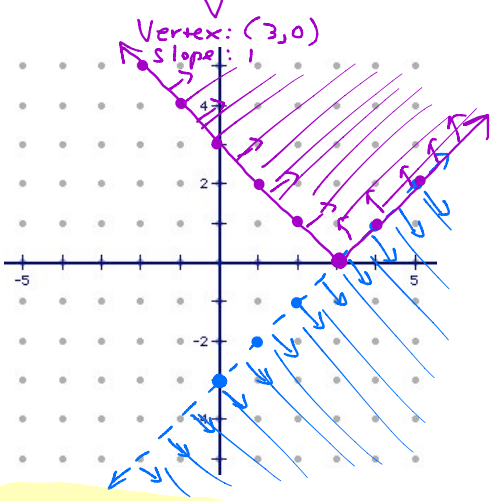
$-8 = -8$

TRUE

INFINITELY MANY SOLUTIONS

DEPENDENT SYSTEM

3. $\begin{cases} y < x - 3 & \text{dashed} \\ y \geq |x - 3| & \text{solid} \end{cases}$



No Solution. No points in common.

INCONSISTENT SYSTEM

Ch 3: Applications of systems of Equations and Inequalities

14. Suppose you bought eight oranges and one grapefruit for a total of $4.60. Later that day, you bought six oranges and three grapefruits for a total of $4.80. Now you want to find the price of each orange and of each grapefruit. Write an equation for each purchase. Solve the system of equations.

x = oranges
y = grapefruit

$8x + y = 4.60$ (×−3) → Mult. by −3

$6x + 3y = 4.80$ (×−3)

$-24x - 3y = -13.80$

$+\ 6x + 3y = 4.80$

$\frac{-18x}{-18} = \frac{-9.00}{-18}$

$x = .50$

$8(.50) + y = 4.60$

$-4 \quad + y = 4.60$

-4

$y = .60$

$.50$ per Orange

$.60$ per Grapefruit

15. Melissa babysits a maximum of 10 hours per week for her neighbor and her brother. She spends at least 3 hours babysitting for her neighbor and at most 5 hours babysitting for her brother.

a) Write a system of inequalities to model the situation.

N = # hours babysitting for her Neighbor.
B = # hours babysitting for her Brother.

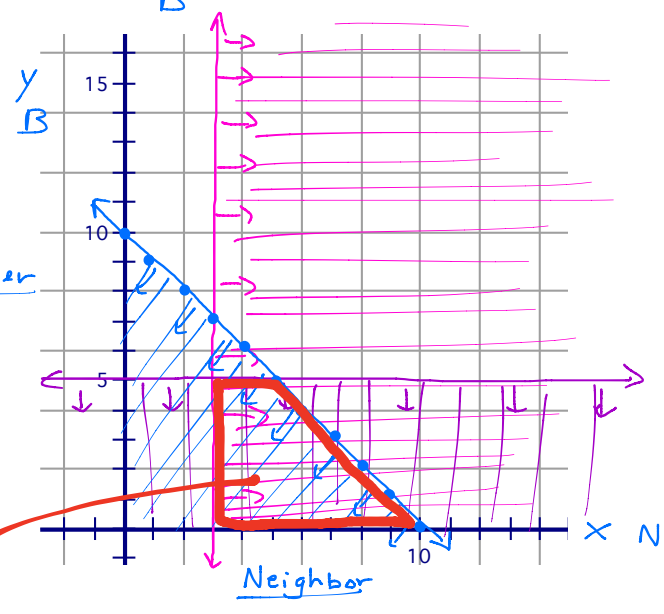
b) Graph and solve the system.

- $N + B \leq 10$
- $N \geq 3$
- $B \leq 5$

$N + B \leq 10$

$-x \quad + y \leq 10 \quad -x$

$y \leq -x + 10$



Chapter 2: Writing equations of lines

16. Write the equation of the line in point–slope form and slope-intercept form given the following information.

Perpendicular to $y = \frac{1}{3}x - 56$ through point (12, -4)

$m = \frac{1}{3}$ ← Fix

$m = -\frac{3}{1}$

(12, -4)

Point-Slope: $y + 4 = -3(x - 12)$

Slope-Intercept: $y = -3x + 32$

Standard: $3x + y = 32$

$y - (-4) = -3(x - 12)$

$y + 4 = -3(x - 12)$ pt-slope

$y + 4 = -3x + 36$

$-4 \quad -4$

$y = -3x + 32$ slope-int.

$+3x \quad +3x$

$3x + y = 32$ Standard

17. Write the equation of the line in point–slope form and slope-intercept form given the following information.

Parallel to $y = -\frac{1}{4}x + 5$ through point (12, -7)

$m = -\frac{1}{4}$ ← Fix

(12, -7)

Point-Slope: $y + 7 = -\frac{1}{4}(x - 12)$

Slope-Intercept: $y = -\frac{1}{4}x - 4$

Standard: $x + 4y = -16$

$y - (-7) = -\frac{1}{4}(x - 12)$

$y + 7 = -\frac{1}{4}(x - 12)$ pt-slope

$y + 7 = -\frac{1}{4}x + 3$

$-7 \quad -7$

$y = -\frac{1}{4}x - 4$ slope-int.

$+\frac{1}{4}x \quad +\frac{1}{4}x$

$\frac{1}{4}x + y = -4$ ·4

$x + 4y = -16$ Standard

18. Write an equivalent equation in standard form for $y = \frac{2}{3}x - 5$ ·3

$3y = 2x - 15$

$-2x \quad -2x$

$-2x + 3y = -15$

OR $2x - 3y = 15$