

EXAM 2/CHAPTER 3-4.4
60 POINTS POSSIBLE

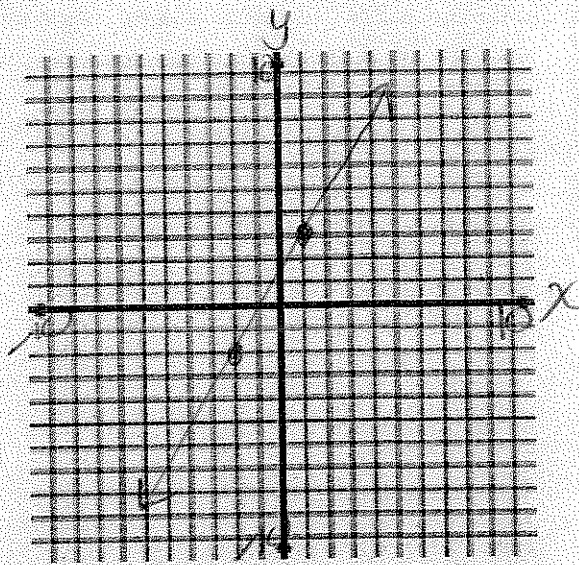
NAME Key

LEAVE ALL ANSWERS EXACT UNLESS THE PROBLEM INDICATES OTHERWISE
SHOW ALL WORK IN ORDER TO EARN FULL CREDIT
LABEL ALL AXES AND WRITE IN THE SCALE

1. (6 POINTS) Graph the equation $5x - 3y = -4$ using the method of your choice. LABEL AXES AND WRITE IN THE SCALE!

point plotting

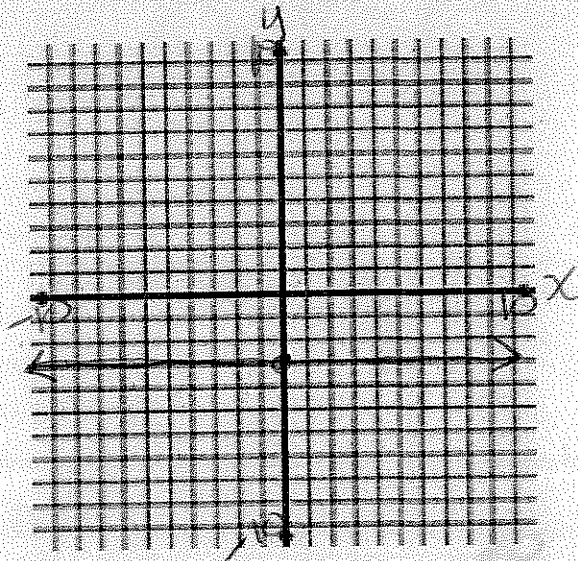
x	$5x - 3y = -4$	(x, y)
1	$5(1) - 3y = -4$ $-3y = -9$ $y = 3$	$(1, 3)$
-2	$5(-2) - 3y = -4$ $-3y = 6$ $y = -2$	$(-2, -2)$



2. (6 POINTS) Graph $7y = -21$ using any method. LABEL AXES AND WRITE IN THE SCALE!

$$\frac{7y}{7} = \frac{-21}{7}$$

$$y = -3$$



3. (8 POINTS) Use the given conditions to write an equation for the line in point-slope form and slope-intercept form.

Passing through (6, -9) and (-2, -4).

$$m = \frac{-4 - (-9)}{-2 - 6}$$

$$m = \frac{5}{-8}$$

point-slope:

$$y - (-9) = -\frac{5}{8}(x - 6)$$

$$y + 9 = -\frac{5}{8}(x - 6)$$

OR

$$y - (-4) = -\frac{5}{8}(x - (-2))$$

$$y + 4 = -\frac{5}{8}(x + 2)$$

Slope-intercept

$$y + 9 = -\frac{5}{8}(x - 6)$$

$$y + 9 = -\frac{5}{8}x + \frac{15}{4}$$

$$-9 \quad -9 \cdot \frac{4}{4}$$

$$y = -\frac{5}{8}x + \frac{15}{4} - \frac{36}{4}$$

$$y = -\frac{5}{8}x - \frac{21}{4}$$

$$\frac{-\frac{5}{8} \cdot (-4)}{1}$$

Point-slope form: $y + 9 = -\frac{5}{8}(x - 6)$ OR $y + 4 = -\frac{5}{8}(x + 2)$

Slope-intercept form: $y = -\frac{5}{8}x - \frac{21}{4}$

4. (4 POINTS) Determine whether the given ordered pair is a solution of the system.

(3, 11)

$6x - 2y = -4$ (A)

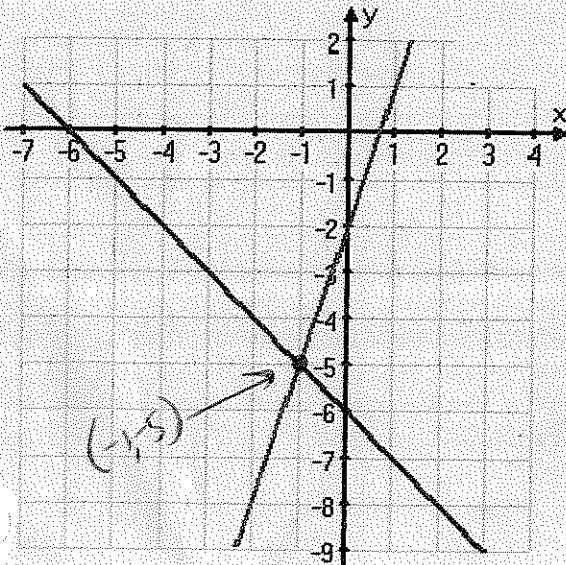
$3x + y = -11$ (B)

(A) $6(3) - 2(11) \stackrel{?}{=} -4$
 $+18 - 22 \stackrel{?}{=} -4$
 $-4 = -4 \checkmark$

(B) $3(3) + (11) \stackrel{?}{=} -11$
 $9 + 11 \stackrel{?}{=} -11$
 $20 \neq -11$

NO

5. (6 POINTS) Use the graph below to find the solution of the system of linear equations.



Solution: $\{-1, -5\}$

This system is (circle one): Consistent Inconsistent

The equations are (circle one): Dependent Independent

6. (16 POINTS, 8 POINTS EACH) Solve the following systems of linear equations by the substitution or addition method. Use set notation to express solution sets.

a.

$$x + 2y = 12 \quad (A)$$

$$3x - y = 1 \quad (B)$$

Step 1: $A + 2B$, elim. y

Step 2: Sub. $x = 2$ into eq A

$$x + 2y = 12$$

$$x + 2y = 12$$

$$6x - 2y = 2$$

$$2 + 2y = 12$$

$$\frac{7x}{7} = \frac{14}{7}$$

$$\begin{array}{r} 2 + 2y = 12 \\ -2 \quad -2 \\ \hline \frac{1}{2} \cdot 2y = 10 - \frac{1}{2} \end{array}$$

$$x = 2$$

$$y = 5$$

Solution: $\{(2, 5)\}$

This system is (circle one): **Consistent**

Inconsistent

The equations are (circle one): **Dependent**

Independent

b.

$$2x + y = -1 \quad (A)$$

$$4x + 2y = -2 \quad (B)$$

Step 1: $-2A + B$, elim. y

$$-4x - 2y = 2$$

$$4x + 2y = -2$$

$$0x + 0y = 0$$

$0 = 0$ true!

Solution: $\{(x, y) \mid 2x + y = -1\}$

This system is (circle one): **Consistent**

Inconsistent

The equations are (circle one): **Dependent**

Independent

7. (14 POINTS, 7 POINTS EACH) Solve the following problems using the problem solving techniques learned in the lecture. There will be no credit awarded for trial and error!

a. The sum of two numbers is nine. Twice the first number is the second number less six. Find the numbers.

① Analysis

Let x be the 1st #
Let y be the 2nd #

② Translate

$$x + y = 9$$

$$2x = y - 6$$

③ Solve

$$x + y = 9 \quad (A)$$

$$2x = y - 6 \quad (B)$$

i) Isolate y in eq. A

$$x + y = 9$$

$$y = 9 - x$$

ii) Sub. $y = 9 - x$ into eq. B

$$2x = y - 6$$

$$2x = (9 - x) - 6$$

$$2x = 3 - x$$

$$3x = 3$$

$$x = 1$$

iii) Sub. $x = 1$ into

eq. A

$$x + y = 9$$

$$1 + y = 9$$

$$y = 8$$

④ Conclusion

The numbers are 1 and 8.

b. When a plane flies with the wind, it can travel 2400 miles in 4 hours. When the plane flies in the opposite direction, against the wind, it takes 6 hours to fly the same distance. Find the rate of the plane in still air and the rate of the wind.

① Analysis

Let x be the rate of the plane in still air
Let y be the rate of the wind

② Translate

$$(x + y)(4) = 2400$$

$$(x - y)(6) = 2400$$

$$x + y = 600$$

$$x - y = 400$$

$R \cdot T = D$

with wind	$x + y$	4	2400
against wind	$x - y$	6	2400

③ Solve

$$x + y = 600 \quad (A)$$

$$x - y = 400 \quad (B)$$

i) A + B, elim y

$$x + y = 600$$

$$x - y = 400$$

$$2x = 1000$$

$$x = 500$$

ii) Sub. $x = 500$ into eq. A

$$x + y = 600$$

$$500 + y = 600$$

$$y = 100$$

④ Conclusion

The rate of the plane in still air is 500 mph and the rate of the wind is 100 mph.