Name: _____ Per: _____ Lesson FN – 5: Supplement

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Objective: Writing the Equation of a Line HW FN5 – NYA p.339 #10, 11, 13, 16, 20, 22, 24, 32, 33, 36

Do Now: Solve for y (get it in the form y = everything else).

1. $2y + 5 + 8x = 5$ 2. $60x - 5y = 0$ 3. $-3y + 1 = x$

Exam Test Prep: Which does not belong? a) Constant of Variation b) Concavity c) Slope d) Rate of change

What We Know

- Slope, m, is the steepness of a graph. $m = \frac{\Delta y}{\Delta x}$
- Rate of change is the linear relationship between the dependent and the independent variable. Rate of change is equal to slope.

Slope-Intercept Form of a Line: $y = mx + b$, m = slope b = y-intercept

Working with Equations

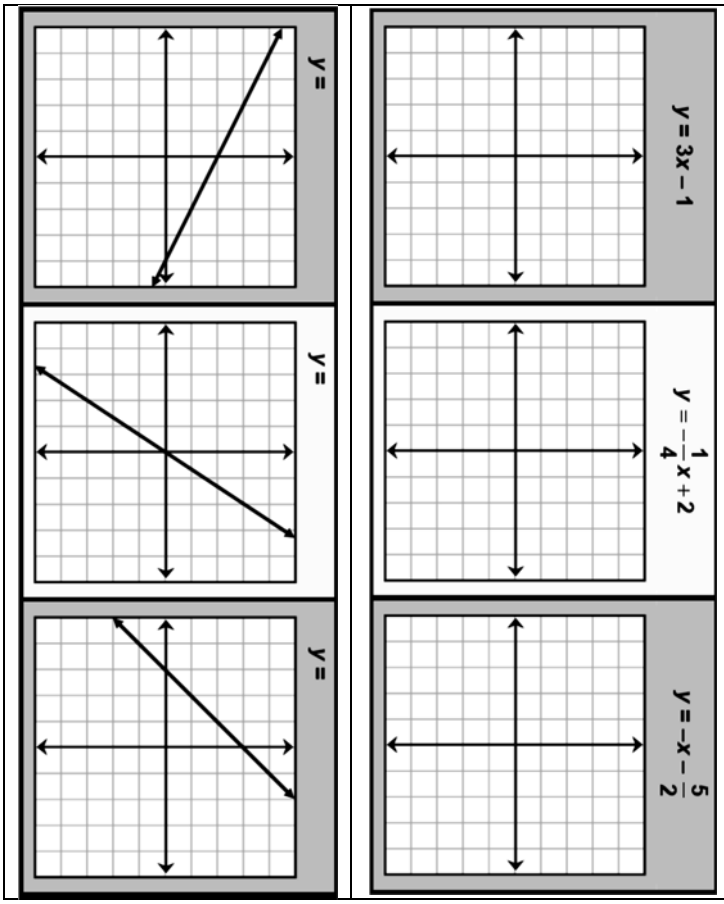
Find the slope and y-intercept:

a) $y = 3x - 5$ ***b***) $y = \frac{7}{6}x + \frac{3}{4}$ ***c***) $y = -\frac{4}{5}x$

Write the equation of the line:

a) m = $\frac{2}{3}$, b = –5 *b*) m = $-\frac{1}{2}$, b = 0 *c*) m = 0, b = –2

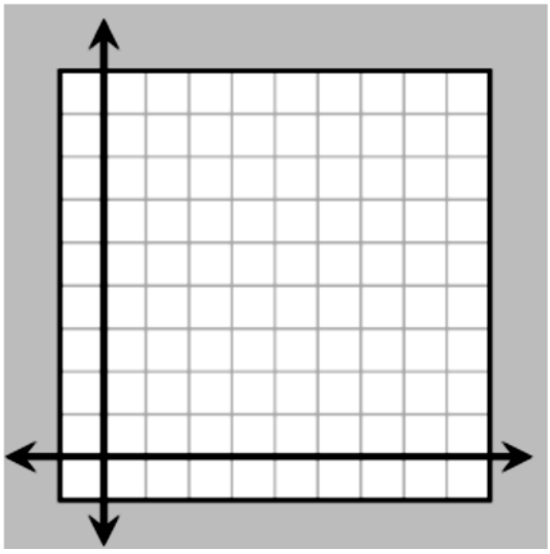
Practice: ROTATE YOUR PAPER



A Music store is selling CDs for $8 each. Today, there is a coupon for $2 off an order total. Write a function *y* for buying *x* CDs and graph it.

y =

How much are 4 CDs?



Using Substitution with Points and Linear Equations

1. Is (8, 4) on the line $y = \frac{3}{4}x - 2$?

2. Is (–3, 1) on the line $y = 2x + 5$?

POINT - SLOPE FORM	SLOPE-INTERCEPT FORM
$y - y_1 = m(x - x_1)$	$y = mx + b$

Making Connections: New and Old

We have learned the slope-intercept form of the equation of a line: $y = mx + b$

- m is slope of the line and b is the y-intercept

Another form of a linear equation is the point-slope form: $y - y_1 = m(x - x_1)$

- m is the slope and (x_1, y_1) is a point on the line

Knowing this, we can write the equation of a line given:

A. Slope and y-intercept
B. Slope and a point
C. Two points

Situation A: Slope and y-intercept

$m = \frac{1}{3}$	Use: $y = mx + b$
$b = -14$	Simply substitute: $y = \frac{1}{3}x - 14$

Practice

1. $m = 5, b = -2$ $y =$

2. $m = -\frac{1}{4}, b = 10$ $y =$

Situation B: Slope and a point

SLOPE – INTERCEPT
$m = 2$, $(3, 4)$ as (x,y)
Use: $y = mx + b$ $4 = 2(3) + b$ $4 = 6 + b$ $-6 \quad -6$ $-2 = b$
Substitute m & b: $y = 2x - 2$

OR

Situation B: Slope and a point

POINT – SLOPE
$m = 2$, $(3, 4)$ as (x_1, y_1)
$y - y_1 = m(x - x_1)$ $y - 4 = 2(x - 3)$ $y - 4 = 2x - 6$ $+4 \quad +4$
Solved: $y = 2x - 2$

← SAME →

Situation B: Practice (Use whichever method you want)

1. $m = -3$, $(0, 0)$	2. $m = \frac{1}{2}$, $(6, 4)$

Situation C: Two Points

1. Find m, the slope between the two points
2. Use m and ONE of the points with slope-intercept or point-slope, as in Situation B.

C. $(1, -1)$ $(2, 6)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - (-1)}{2 - 1} = 7$$

Situation B: Slope and any point

$m = 7$, $(2, 6)$

$y - y_1 = m(x - x_1)$
$y - 6 = 7(x - 2)$
$y - 6 = 7x - 14$
$+6 \quad +6$

Therefore: $y = 7x - 8$

Practice

1. $(4, 10)$ $(-5, -5)$ 2. $(-1, 0)$ $(-3, 4)$

Extra Practice

$m = \frac{2}{3}$ and $(6, 2)$	$m = 4$ and $(-4, -6)$	$m = 0$ and $(1, 6)$
$(4, -5)$ and $(13, 4)$	$(8, 0)$ and $(0, 4)$	$(-5, 3)$ and $(10, 15)$