Creating & Representing Linear Functions: Standard & Point-Slope Forms

Name: _____

Target A: I can model a linear relationship with a standard or point-slope form equation

Target B: I can change a linear equation from standard and/or point-slope form to slope-intercept form.

Target C: I can link the form of a linear equation to particular contexts

Resources:

http://mrnohner.com/standpoint.html

Guide notes

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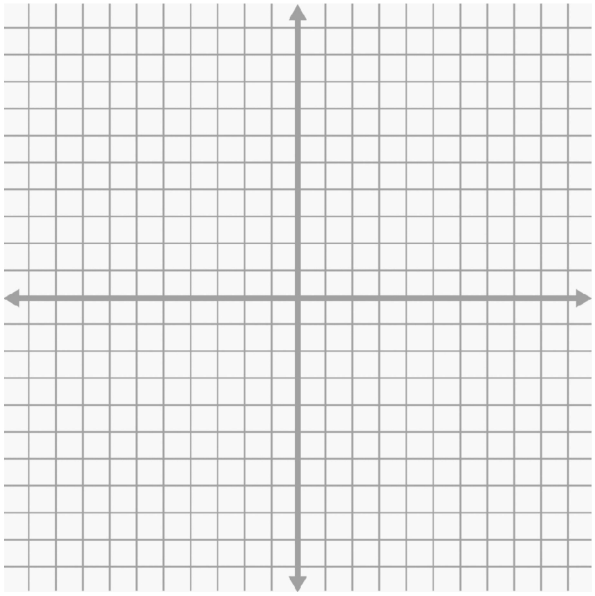
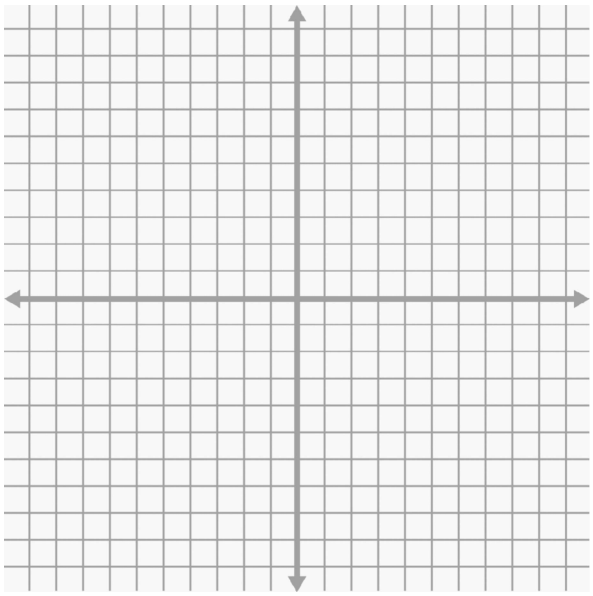
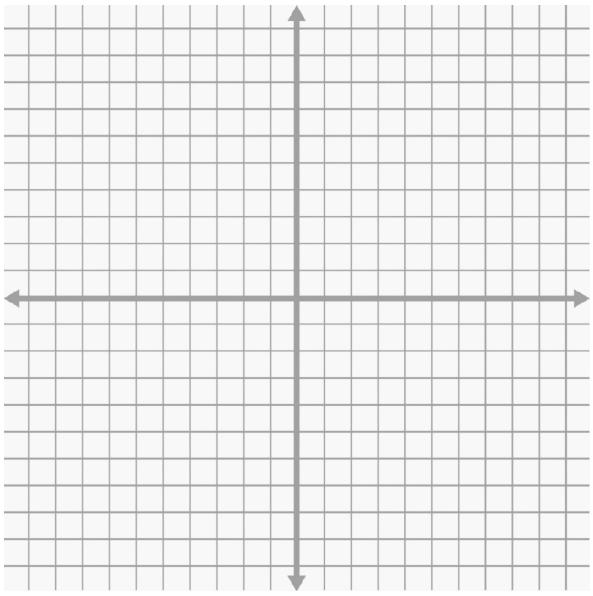
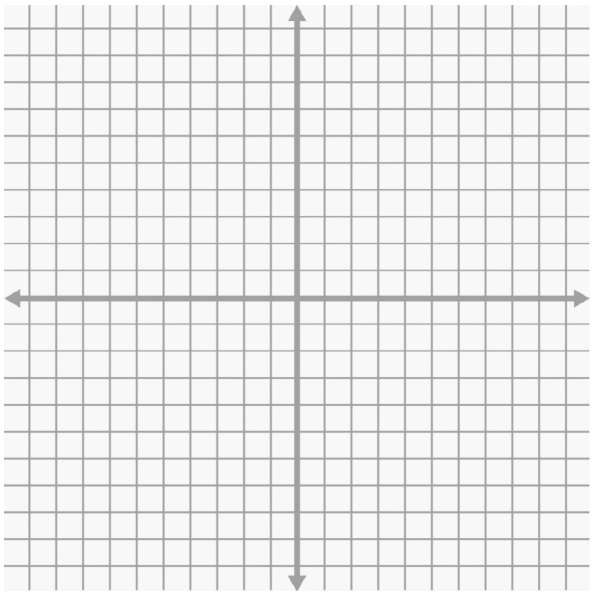
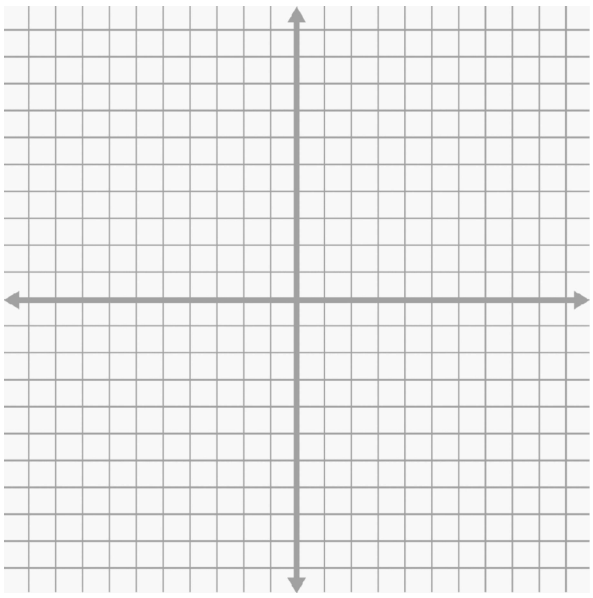
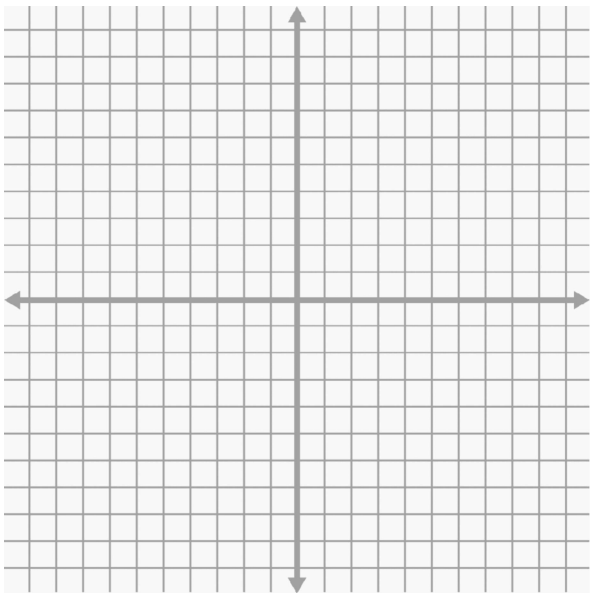


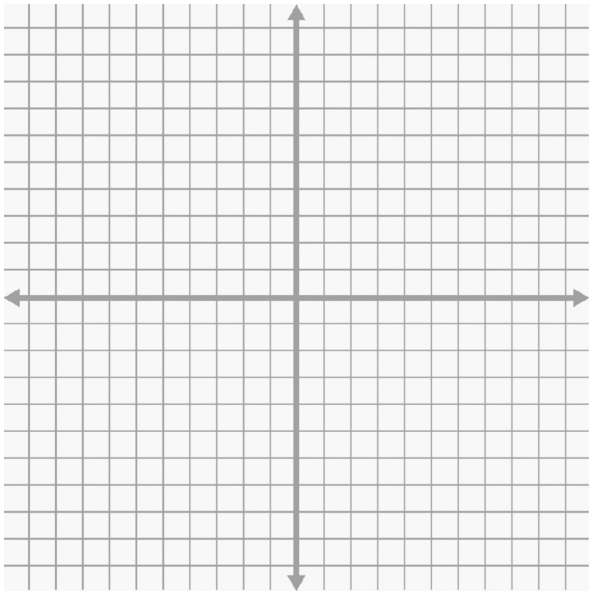


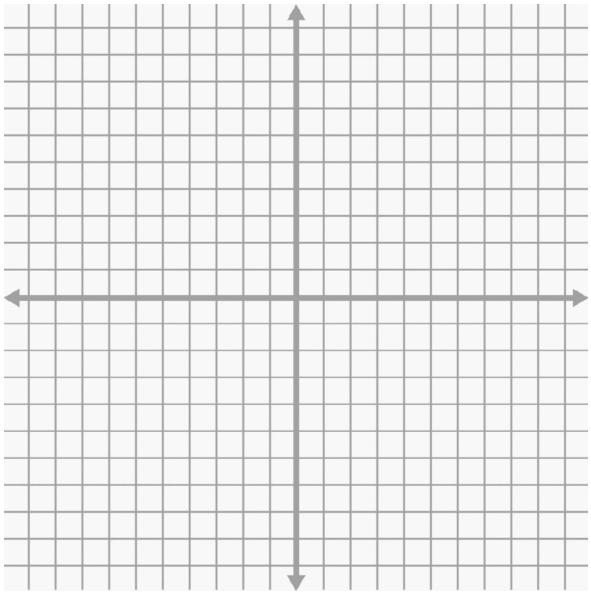


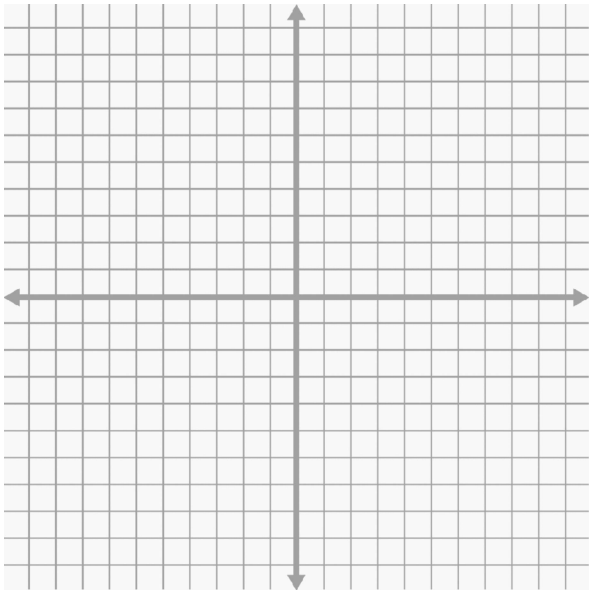


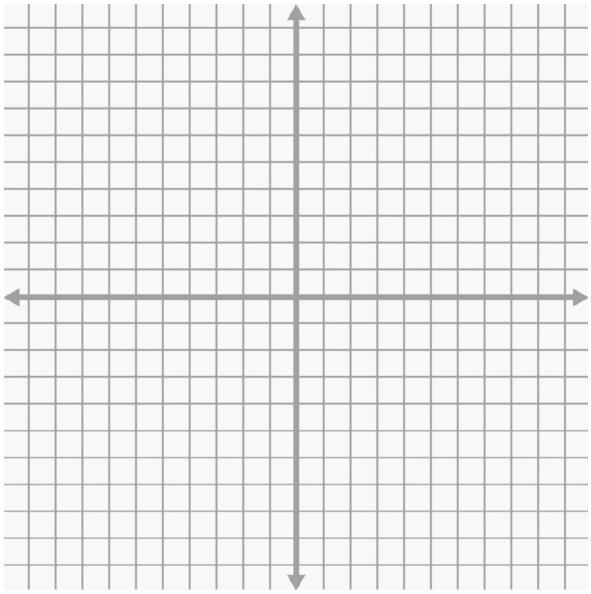


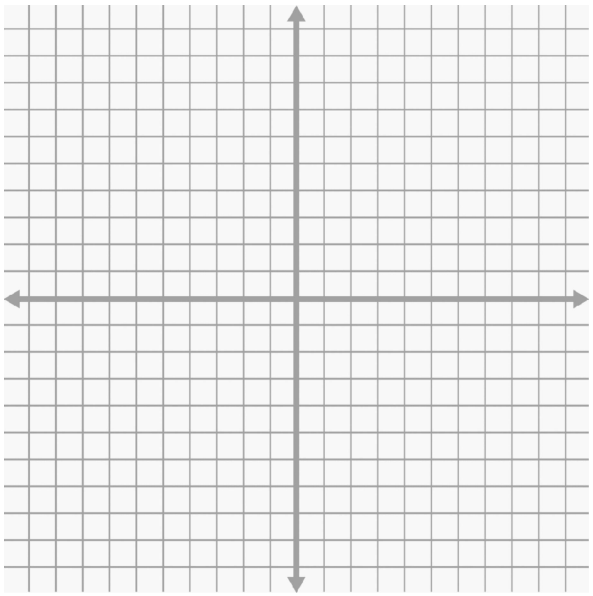


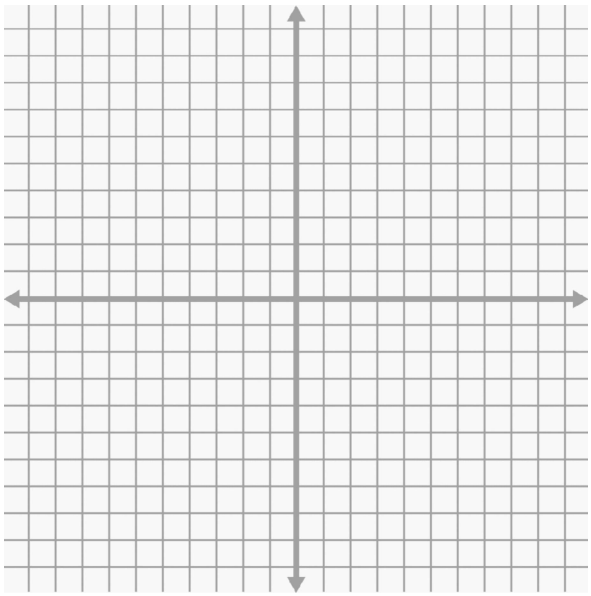


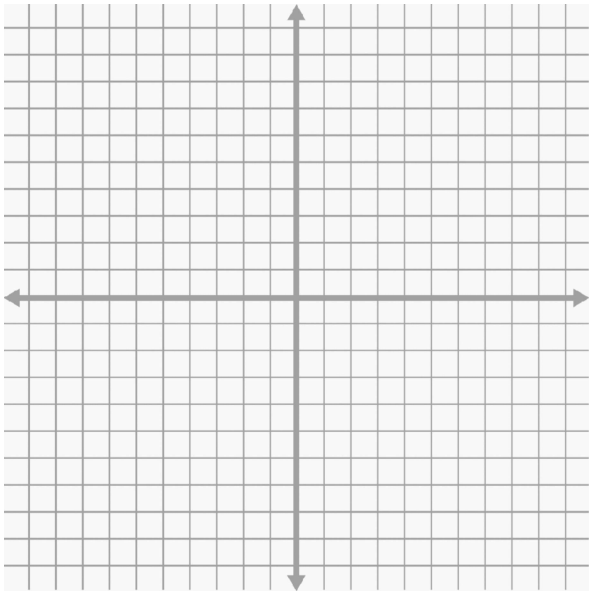


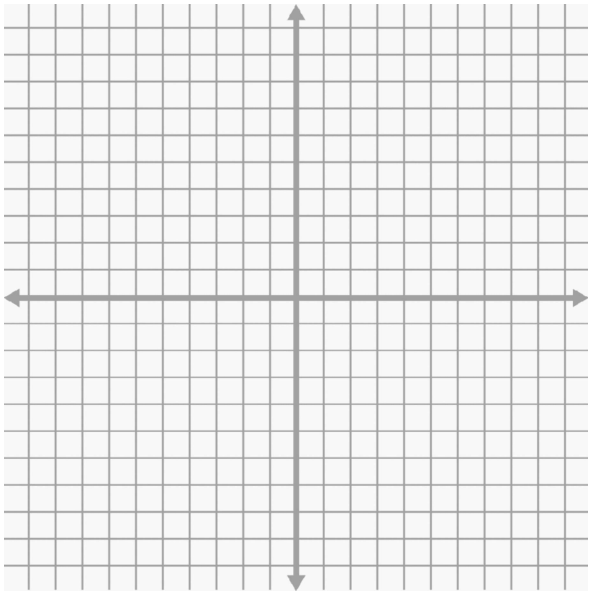


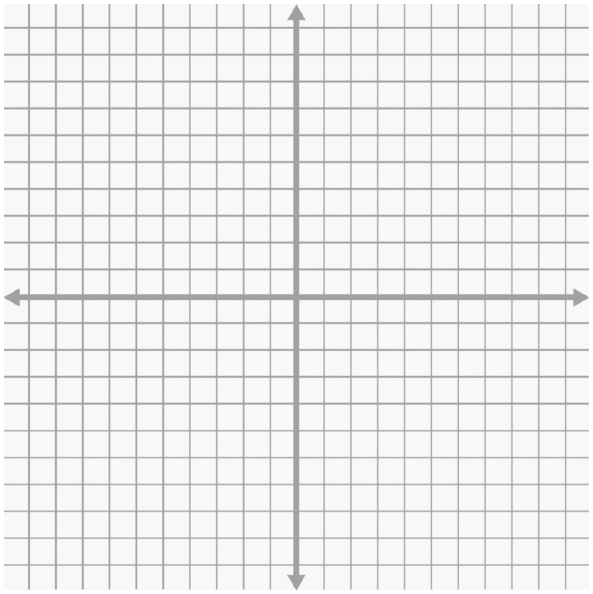


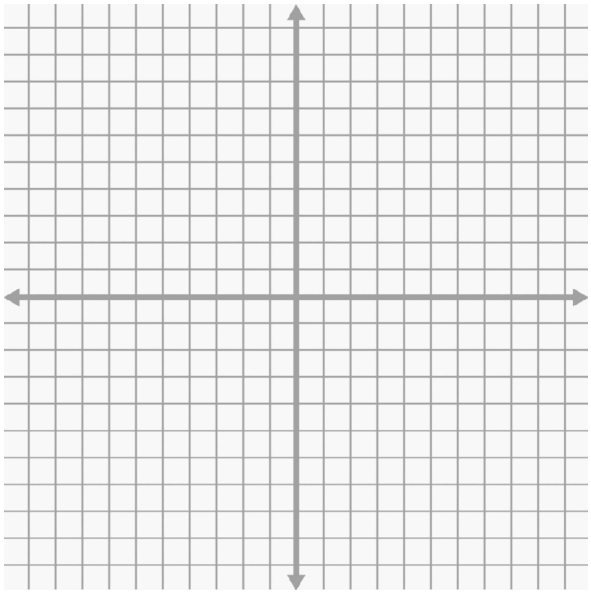


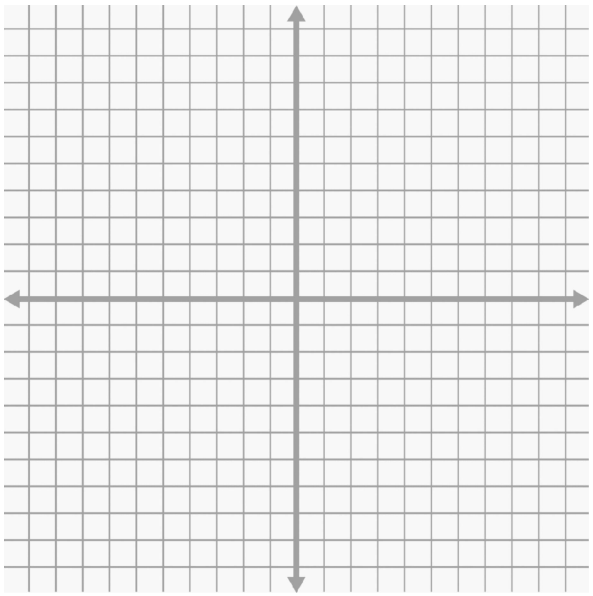


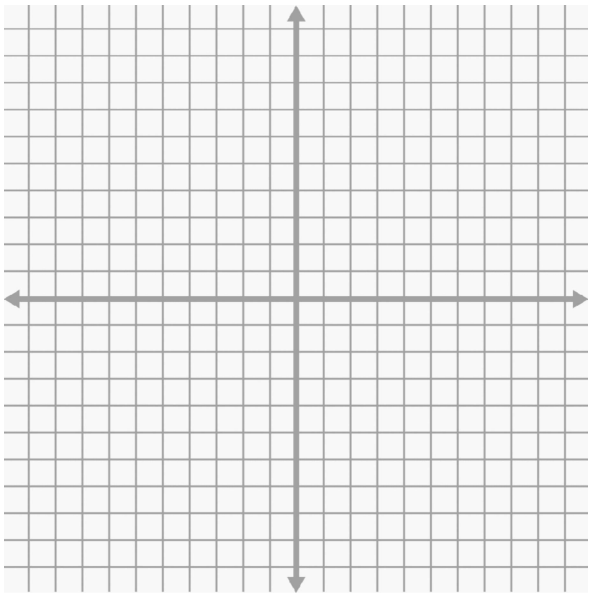












Point Slope Form: Writing and Graphing

Write the point-slope form of the equation given the following information:

1) Slope = $-\frac{7}{4}$, y-intercept = -5

2) through: $(1, 4)$ and $(0, 3)$

3) through: $(0, -5)$ and $(-2, 4)$

4) through: $(4, -2)$ and $(0, 5)$

5) through: $(-1, -4)$ and $(3, -2)$

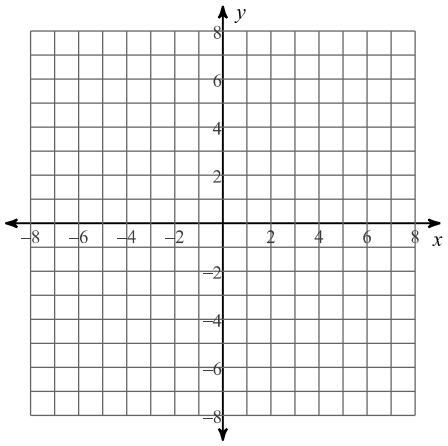
6) through: $(0, -3)$ and $(4, 2)$

7) through: $(5, 0)$ and $(0, -5)$

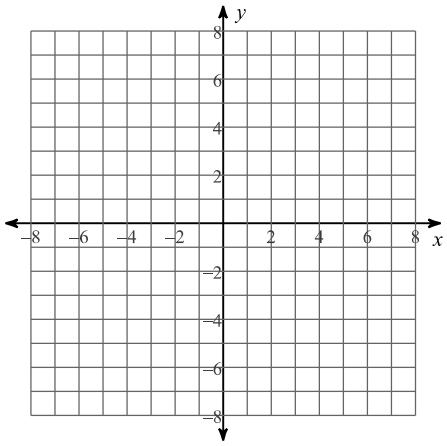
8) through: $(1, -5)$ and $(0, -1)$

Graph the following

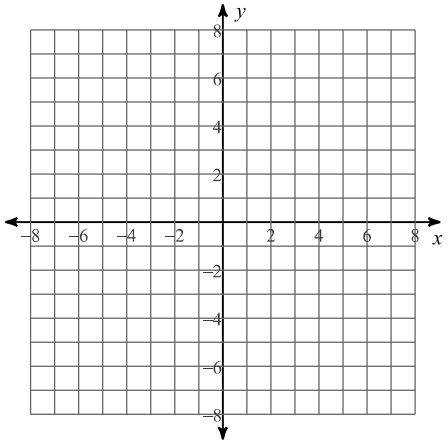
9) $y = \frac{4}{5}(x + 5) + 1$



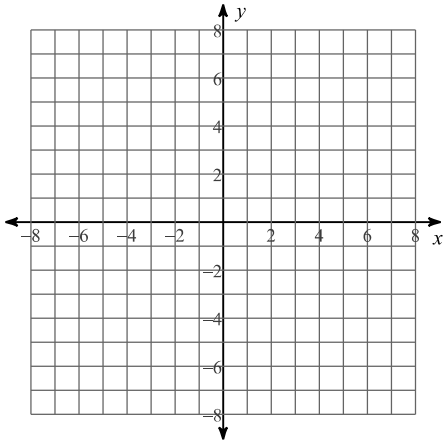
10) $y = -\frac{1}{4}(x - 4) - 1$



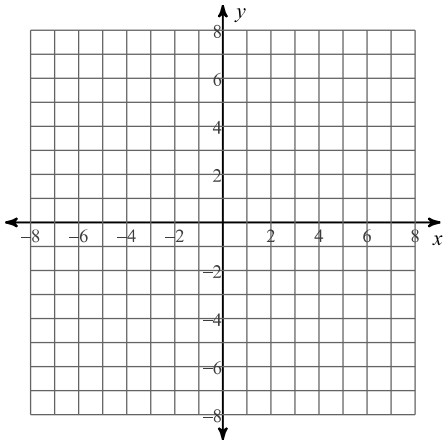
11) $y = -\frac{2}{3}(x - 3)$



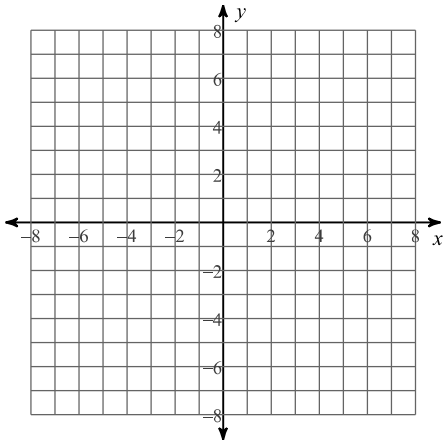
12) $y = -\frac{7}{2}(x + 2) + 2$



13) $y = 8(x + 1) - 3$



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



Word Problems: Point Slope Form

1. Use the following table to write an equation in point slope form.
(Pick two points and write an equation.)

Water Temperature

Time in Seconds	Temperature in Degrees Celsius
24	25
36	30
60	40
72	45
96	55

2. Use the following table to write an equation in point slope form.

Wind Chill with Wind Speed of 20 mph.

Temperature (F)	5	10	15	20	25
Wind Chill (F)	-31	-24	-17	-10	-3

Word Problems: Point Slope Form

3. Use the following table to write an equation in point slope form.
(Pick two points and write an equation.)

Postal Rates

Weight not exceeding (oz)	Cost ($)
1	.34
2	.55
3	.76
4	.97
5	1.18

4. In 1980 the US produced 152 million tons of trash. In 1985 the US produced 164 million tons of trash.

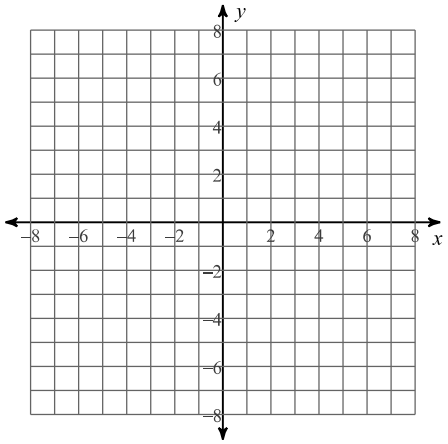
a) Write a point slope equation for the situation.

b) In 1990 the US produced 196 million tons of trash. Does this fit with your equation from part a?

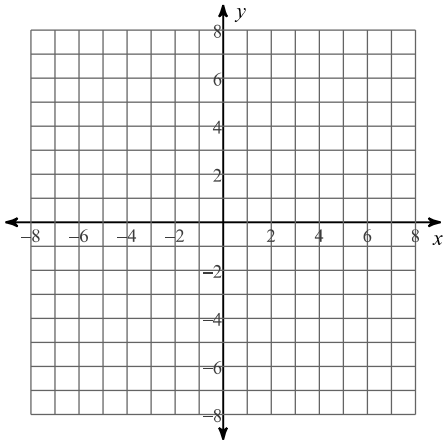
Standard Form: Writing and Graphing

Graph the following equations:

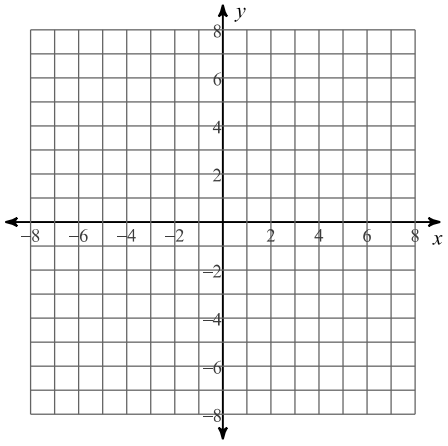
1) 5x - 10y = 20



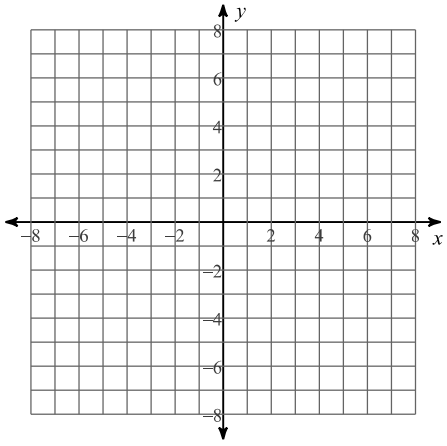
2) 2x - 3y = 12



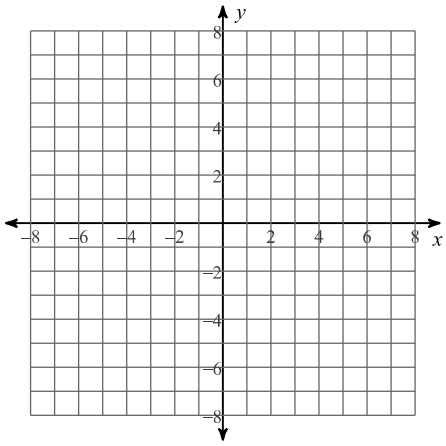
3) 8x + 3y = 24



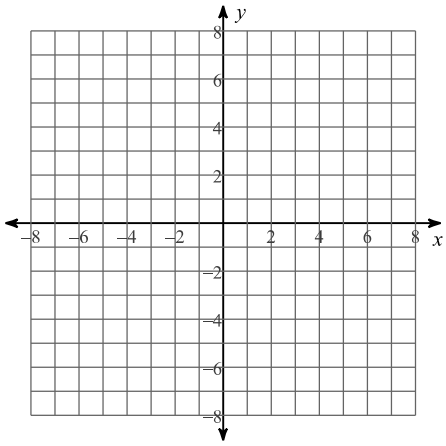
4) x - 3y = 6



5) 6x - 5y = -30

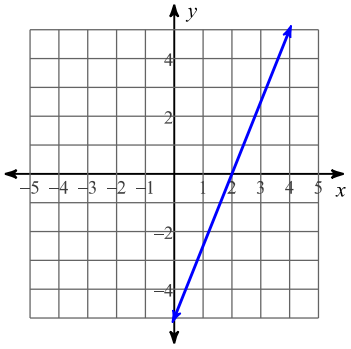


6) 2x + 9y = 18

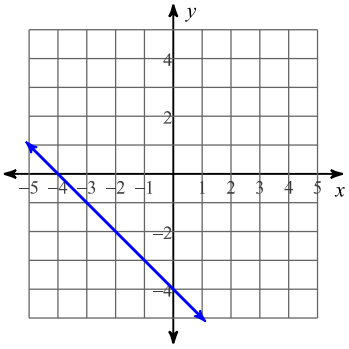


Write the standard form of the equation of each line.

7)



8)



9) You are paving a section of your back patio. Long rectangluar stones are $5 and square stones are $3. What equation models all of the ways you could spend $200.

10) Sausage pizzas cost $12 dollars and cheese pizza costs $8.25. If the budget for your club is $150 dollars then what eqaution models all of the ways you could spend exactly $150.

11) Create a story problem that would be modeled by the equation 18X + 70Y = 1500.

Algebra 1 Name_____

Converting From Standard From To Slope Intercept

Write the slope-intercept form of the equation of each line.

1) $4x + y = -3$

2) $x + 2y = -10$

3) $14x - 3y = -24$

4) $9x + 5y = -40$

5) $10x - 3y = -18$

6) $13x + 6y = 42$

7) $4x + 5y = 0$

8) $8x - 5y = 20$

9) $12x + 7y = -35$

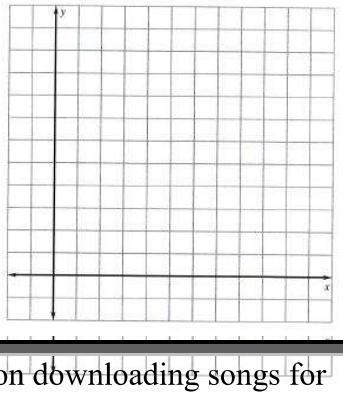
10) $3x + 2y = 16$

Writing Equations in Standard Form Word Problems

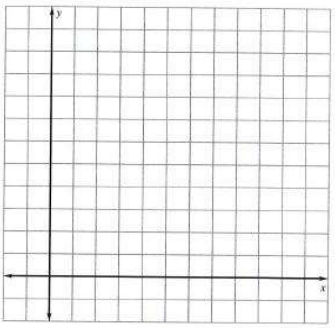
*How many rates (slopes) are there? Is there a starting point? If there is one rate, use slope-intercept form. If there are two rates, then use Standard Form.

*Is there a total given? If there is no total then it is an unknown and you have to use slope-intercept form because that is the form that has a variable by itself (*y* would be the total). If there is a total given then use Standard Form because "C" would be replaced with the total.

1. T-shirts at a flea market cost $4.50 each and shorts cost $6 each. You have enough money to buy exactly 12 t-shirts and 9 pairs of shorts. Write an equation in standard form that models the possible combinations of t-shirts and shorts you can buy. Graph the equation.



2. Your class is taking a trip to the public library. You can travel in small and large vans. A small van holds 8 people and a large van holds 12 people. Your class could fill 15 small vans and 2 large vans. Write an equation in Standard Form that models the possible combination of small and large vans that your class could fill. Graph the equation.



3. You have $30 to spend on downloading songs for your iPod. Company A charges $0.79 per song, and Company B charges $0.99 per song. Write an equation that models this situation.

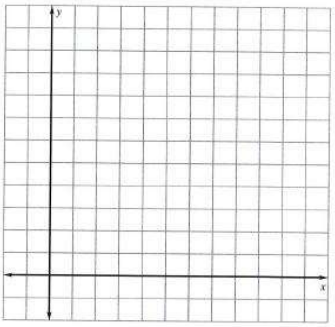
4. You have $6 to spend on lunch today. The drinks cost $1.25 each and the salad costs $0.20 per ounce. Write an equation that models this situation.

5. You have a rectangular plot measuring 16 by 25 feet in a community garden. You want to grow tomato plants that each need 8 square feet of space and pepper plants that need 5 square feet. Write an equation that models how many tomato plants and how many pepper plants you can grow.

How many pepper plants can you grow if you have 15 tomato plants?

6. Concert tickets cost $15 for general admission, but only $9 with a student ID. Ticket sales total $4500. Write and graph an equation that models this situation.

How many student tickets were sold if 150 general admission tickets were sold?



7. A company will lease office space in two buildings. The annual cost is $21.75 per square foot in the first building and $17 per square foot in the second. The company has $86,000 budgeted for rent. Write an equation that models the possible amounts of space rented in the buildings.

How many square feet of space can be rented in the first building if 2500 square feet are rented in the second?

8. The costs of general admission and student tickets to a high school football game are $7 and $4 respectively. The ticket sales for one game totaled $11,200. Write an equation which models the situation.

Review of Standard Form and Point-Slope Form of Linear Equations

What is the formula for calculating slope?

slope, m =

Write the equation for POINT-SLOPE FORM: _____

m =_____ (x_1, y_1) =_____

Write the equation for SLOPE- INTERCEPT FORM: _____

m = _____, b =_____

Write the equation of the line in slope intercept form with the given slope and y-intercept.

1) slope: -2 y-int:(0,3)	m =	b =	1. _____
2) slope: 4 y- int: (0,-4)	m=	b=	2. _____
3) slope: 3 / 4 y-int: (0, 2)	m=	b =	3. _____

Write an equation in point slope and slope intercept form of a line that passes through the given point and has the given slope m.

4.) (-3, -4); m = 1/2

4. Point-slope form _____

Slope-intercept form _____

5.) (5,-6); m = -1

5. Point-slope form _____

Slope-intercept form _____

6.) (-3,0); m = 4/3

6. Point-slope form _____

Slope-intercept form _____

Write an equation of the line in point-slope, slope –intercept and standard form that passes through the given 2 points.

7.) (1, -2) and (-1, 3)

7. Point-slope form _____

Slope-intercept form _____

Standard form _____

7.) (-1, 4) and (2, 4)

8. Point-slope form _____

Slope-intercept form _____

Standard form _____

9.) (4, 2) and (6, 6)

9. Point-slope form _____

Slope-intercept form _____

Standard form _____

10.) (2, 3) and (3, -2)

10. Point-slope form _____

Slope-intercept form _____

Standard form _____

Write an equation in standard form of a line that has the given slope and the passes through the given point.

11) m=4/3 , (3, 4)

11. _____

12) m = 2, (2, 0)

12. _____

13) m = 0, (5, 6)

13._____

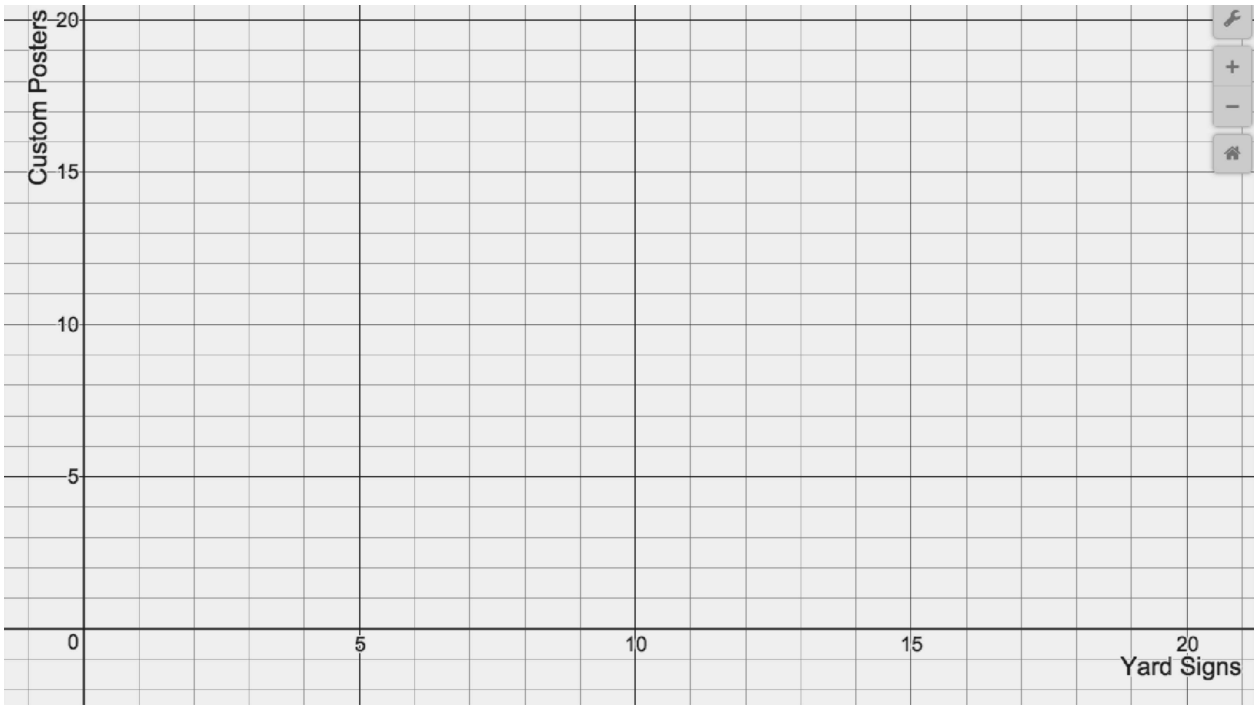
Application Problems

1) A cell phone company charges a flat fee of 20 dollars plus 3 cents a call. What is the total bill if there was a total of 200 calls for the month.

2) As a small side business you start washing cars. You have $64 dollars to spend on advertisements. You can spend $4 a piece on custom posters or you can spend $8 on a piece for yard signs.

a) What is the equation that matches all the way you can spend all $64?

b) Graph the equation below.



c) What does the slope mean in this situation?

d) What can you say about all the points under the line like (5,2)? What about the lines over the line like (10,10)?

Application Problems

4) You take a 20 minute Lyft ride downtown and it costs $27.50. When you return home and there is a traffic jam and it takes 32 minutes resulting in a bill of $41.90.

a) Write an equation to model the total charge y (in dollars) in terms of x (the number of minutes) in point slope form.

b) Find the y-intercept. What does it mean in this situation?

5) Glenna wants to rent a car for a trip to Key West for one week. She calls two car rental companies to get prices. Mr. Kotter's Rentals rents a Cadillac Escalade for $99 for one week plus $0.11 per mile over 100 miles. Barbarino's Rentals has the same vehicle for $75 per week and $0.15 per mile over 150 miles.

a) If it is 432 miles to Key West, which company has the better deal?

b) How many miles would Glenna drive before she would be spending the same amount at either company?

Application Problems

6) When Hurricane Maria hit Puerto Rico the federal government went to contractors to provide food aid. The contractor said getting 24,000 meals flown to the island would cost $99,600. Getting 40,0000 meals would cost $150,000 dollars.

a) Find the *point-slope equation* that models this situation

b) Convert that equation to *slope intercept form*.

c) What does the slope mean in this situation?

d) What does the y-intercept mean in this situation?

e) If your budget was $250,000, approximately how many meals could you afford?

Practice Test: Point Slope and Standard Form

Target A: I can model a linear relationship with a standard or point-slope form equation

1) Write the equation of a line through (5, 13) with a slope of 5 .

2) What was the point and slope that was used to make the equation y = 4(x+3)-2

3) You are planning a party and want to order sushi. Unagi rolls are $6 and avocado rolls are $4. What is the equation that models all the different ways you could spend $120.

Target B: I can change a linear equation from standard and/or point-slope form to slope-intercept form.

Rewrite the following equations in slope intercept form:

4) $y = \frac{1}{3}(x - 15) - 8$

5) $2x - 11y = 22$

6) $y = -4(x + 2) + 3$

7) $2x - 6y = 15$

Practice Test: Point Slope and Standard Form

Target C: I can link the form of a linear equation to particular contexts

Circle which form works best and write the equation for each situation.

Clayton got a cactus on his birthday. It has been a 4 months and now his cactus is 17 inches tall. He knows that this type of cactus typically grows 1 inch every 4 months.

8) I would choose: Point Slope, Standard Form, Slope intercept Form

9) The equation of the line would be:

You are ordering trees for your new house. Japanese Maples weigh 20 pounds and Douglas Firs weigh 25 pounds. Your trailer can only hold 200 pounds safely. What is the equation that models how many you could purchase and not exceed the weight limitations.

10) I would choose: Point Slope, Standard Form, Slope intercept Form

11) The equation of the line would be:

You are filling up the pool in your backyard. After 4 minutes it 2 feet deep. After 10 minutes it is 5 feet deep.

12) I would choose: Point Slope, Standard Form, Slope intercept Form

13) The equation of the line would be:

Challenge Problems

1) **Figure This!**

When Polygon and Exponent ran a 50-meter race, Polygon crossed the finish line while Exponent was at the 45-meter mark. The two friends decide to race again. This time, Exponent starts 5 meters ahead of Polygon, who is at the starting line. If each runs at the same speed as in the previous race, who will win?

2) **Figure This!**

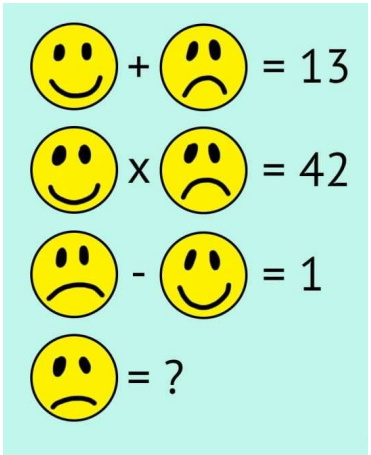
Would you rather work seven days at $20 per day or be paid $2 for the first day and have your salary double every day for a week?

3) **Figure This!** Helix can usually stay in the sun 8 minutes before being sunburned. Using a sun tan lotion product with SPF (Sun Protection Factor) 10 means that he can stay in the sun 8x10, or 80 minutes before being burned. Helix put SPF 10 lotion on five minutes after he got to the beach. An hour later, he is burned. Why?

4) **Figure This!**

The arm of the *Statue of Liberty* is 42 feet long. How long is her nose?

5)



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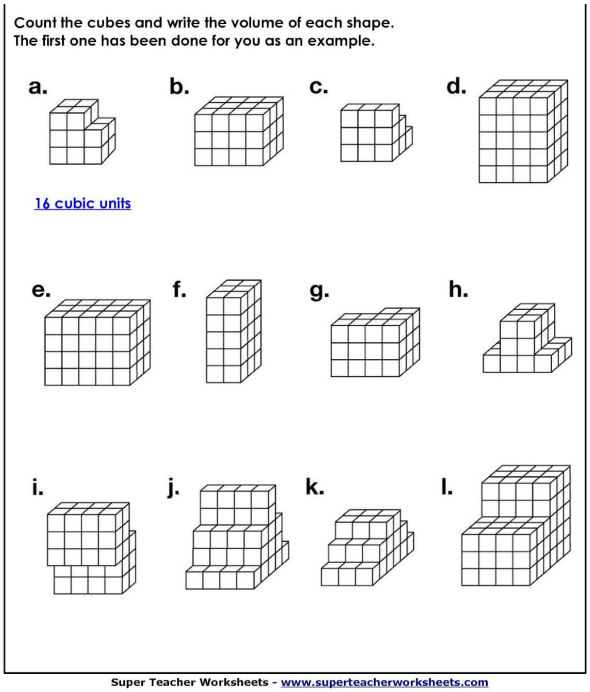
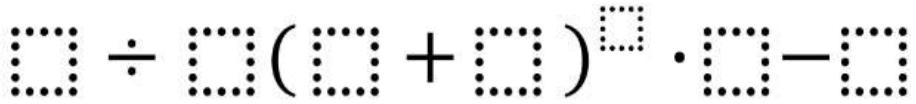


Challenge Problems

7) Using only single digit values 0-9. What is the largest number this can be when evaluated?



Don't bother asking me unless your answer is bigger than 1,000,000,000,000.

8) $(1,234)^2$ means 1,234 * 1,234; $(1,234)^3$ means 1,234 * 1,234 * 1,234; and so forth. When $(1,234)^{23}$ is completely multiplied out, what will the number be in the ones place?

9) Solve for the variables A through F in the equations below, using the digits from 0 through 5. Every digit should be used only once. A variable has the same value everywhere it occurs, and no other variable will have that value.

$$A + A + A = A^2$$
$$B + C = B$$
$$D * E = D$$
$$A - E = B$$
$$B^2 = D$$
$$D + E = F$$

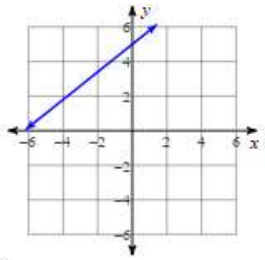
Point-Slope and Standard Form Answers

Assignment 1: Point Slope Form: Writing and Graphing

1) $y = -\frac{7}{5}(x-5) - 4$ 2) $y = \frac{6}{5}(x-5) + 1$ 3) $y = -2(x-3) - 4$ 4) $y = -\frac{7}{4}(x-4) - 2$

5) $y = \frac{1}{2}(x+1) - 4$ 6) $y = \frac{1}{2}(x-3) + 5$ 7) $y = \frac{4}{5}(x+5) - 1$ 8) $y = -4(x-1) - 5$

9)



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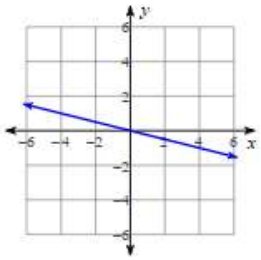

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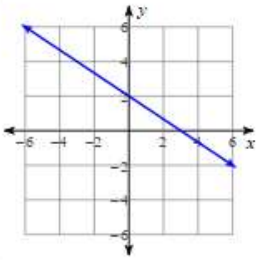

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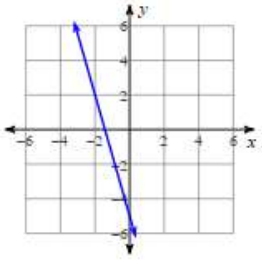

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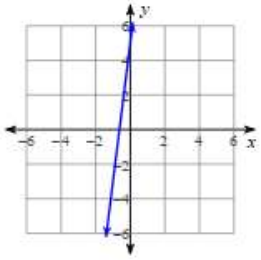

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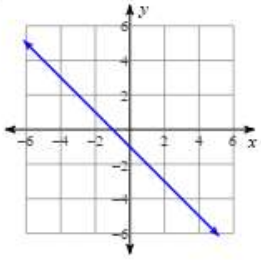


Assignment 2: Word Problems: Point Slope Form

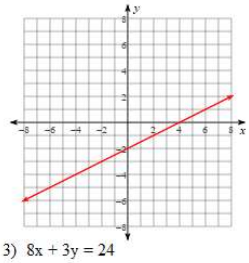
1) y = 5/12(x-24) + 25 2) y = 1.4(x-5) - 31 3) y = 0.21(x-1) + 0.34

4a) y = 2.4(x - 1980) + 152 4b) No, we must be increasing our yearly waste, total bummer.

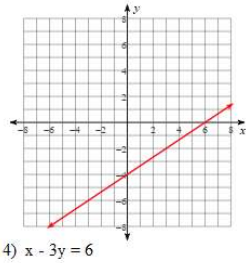
Point-Slope and Standard Form Answers

Assignment 3: Point Slope Form: Writing and Graphing

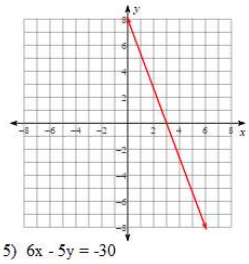
1) 5x - 10y = 20



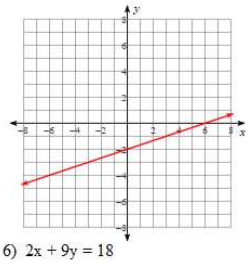
2) 2x - 3y = 12



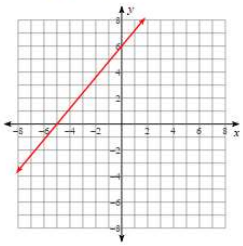
3) 8x + 3y = 24



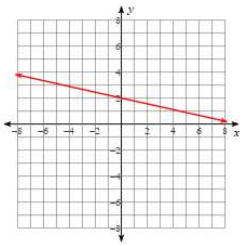
4) x - 3y = 6



5) 6x - 5y = -30



6) 2x + 9y = 18



7) $5x-2y=10$

8) $x+y=-4$

9) 5L+3S=200

10) 12S + 8.25C = 150

11) Answers will vary

Assignment 4: Converting From Standard Form to Slope-Intercept Form

1) $y=-4x-3$

2) $y=-\frac{1}{2}x-5$

3) $y=\frac{14}{3}x+8$

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

5) $y=\frac{10}{3}x+6$

6) $y=-\frac{13}{6}x+7$

7) $y=-\frac{4}{5}x$

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

9) $y=-\frac{12}{7}x-5$

10) $y=-\frac{3}{2}x+8$

Assignment 5: Writing Equations in Standard Form: Word Problems

1) 4.50T + 6S = 108 2) 8S + 12L = 144 3) 0.79A + .99B = 30
4) 1.25D + 0.20S = 6 5) 8T + 5P = 400 , 56 pepper plants
6) 15G + 9S = 4500, 250 student tickets
7) 21.75F + 17S = 86000 , 2000 sq. ft.
8) 7G + 4S = 11200.

Point-Slope and Standard Form Answers

Assignment 6: Review of Standard Form and Point Slope Form of Linear Equations

1) y = -2x+3 2) y = 4x-4 3) y = 3/4x + 2 4) y = ½(x+3) - 4
5) y = -1(x-5) -6 6) y = 4/3(x-0) - 3

Assignment 7: Application Problems

1) 26 2a) 4P + 8Y= 64 2c) For each yard sign you lose the ability to buy 2 posters
2d) That combination would be possible to buy for under $64. Those points above the line represent combinations that would be impossible to buy for $64
3a) y = 1.2(x-20)+27.50 b) That the flat fee for pick up is $3.50.
4a) Barbino's rentals. 4b) 887.5 miles both cost $185.63
5a) y = 3.15(x-24000) + 99600 5b) y = 3.15x + 24000 5c) Each meal costs $3.15
5d) The cost of flying the plane to Puerto Rico 5e) 71746 meals

Assignment 8: Practice Test: Point Slope and Standard Form

1) y = 5(x-2)+13 2) slope= 4 and (-3, -2) 3) 6U + 4A = 120
4) y = ⅓ x -13 5) y = 2/11x-2 6) y = -4x-5 7) y = 1/3x -2.5
8) Point Slope: y = ¼(x-4)+17 9) Standard Form 20J + 25D = 200
10) Point Slope: y= ½(x-4) + 2