

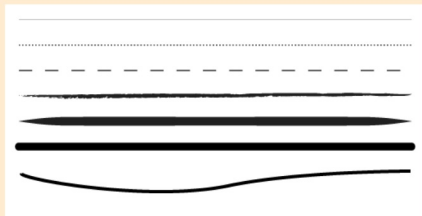
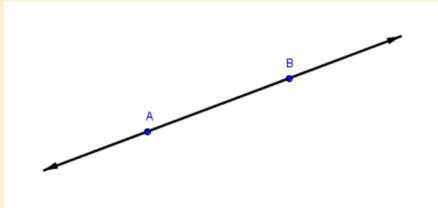
Assignment Self-Monitoring Sheet

Welcome 9th Grade!	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: <u>9/11</u> Topic: _____	0 1 2	I read more about Dr. Okikiolu
Tuesday Date: <u>9/12</u> Topic: <u>Gradient Practice</u>	0 1 2	Solving for missing coordinates was a challenge!
Wednesday Date: _____ Topic: _____	0 1 2	
Thursday Date: _____ Topic: _____	0 1 2	
Friday Date: _____ Topic: _____	0 1 2	



Warm-Up

Write a definition for the term "*line*".



Done?:

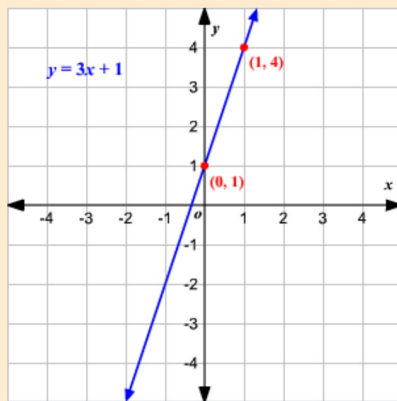
- How many points are in a line...?
- How thick is a line...?

Class Plan:

1. Warm-up
2. What are the different forms of linear equations? Benefits?
3. Classify equations
4. Apply forms to real-life
....depend your type of form.
5. Translate between forms.
6. Joke Break
7. Examples, Graph both forms

E**THE EQUATION OF A LINE**

Definition: A rule which connects the **x** and **y-coordinates** of **all** points on the line.



The equation of a line defines all *coordinate pairs* (points) on the line.

The equation also gives us a quick way to check if a specific point is on the line.

There are multiple forms of writing the equation of a line.

Record FORMS and BENEFITS in class notebook

Two our book uses:

- Gradient-Intercept Form (Slope-Intercept)

$$y = mx + c$$

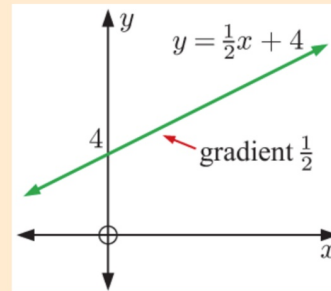
- Standard Form

$$Ax + By = C$$

Gradient-Intercept Form

$$y = mx + c$$

gradient (slope) \swarrow m \nwarrow c \swarrow y-intercept



Useful for...

- Quickly finding a slope and/or y-int.
- Decent for finding y's from x's.

General Form

$$Ax + By = C \quad (A, B, \text{ and } C \text{ are coefficients.})$$

Examples: $4x + 5y = 3$ and $x - 3y = -4$

Generally written with positive coefficient of x .

Benefits...

- Find and graph x and y -intercepts.
- Can write equations without fractions/decimals.
- Preferred form when solving by elimination or matrices.

$$Ax + By + Cz = D$$

Identify the form of the equation

General

$$5x + 2y = 8$$

$$2x - 9y = 8$$

Intercept

$$y = -x + 4$$

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

$$y = 3x - 2$$

Neither

$$x - \frac{y}{3} = 7$$

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Neither

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Which form would be best with each scenario?
Defend your choice and write the equation!

1) Max earns \$2 per week for allowance and \$0.50 each load of laundry he puts in the washer.



$$y = mx + c$$

$$y = .5x + 2$$

x: # loads

y: total week\$

$$\left\{ \begin{array}{l} Ax + By = C \\ w: \text{week} \quad l: \text{loads} \\ .5l + 2w = D \\ l + 4w = 2D \end{array} \right.$$

Example: Translate from...

General Form \leftrightarrow Gradient Intercept Form

$$\begin{array}{r} x + 5y = 9 \\ \hline \end{array}$$

$-x$ $1-x$

$$\frac{5y}{5} = \frac{9-x}{5}$$

$$y = \frac{9}{5} - \frac{x}{5}$$

$$M = -\frac{1}{5}$$

..... $\rightarrow y = mx + c$

$$\begin{array}{r} y = 3x + 7 \\ \hline \end{array}$$

$-3x$ $-3x$

$$y - 3x = 7$$

..... $\rightarrow Ax + By = C$

Example: Translate from...

Gradient Intercept Form-->

General Form ... Remember - no fractions!

$$5(y) = \left(\frac{1}{5}x + \frac{6}{5}\right) 5$$

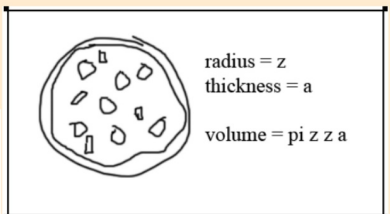
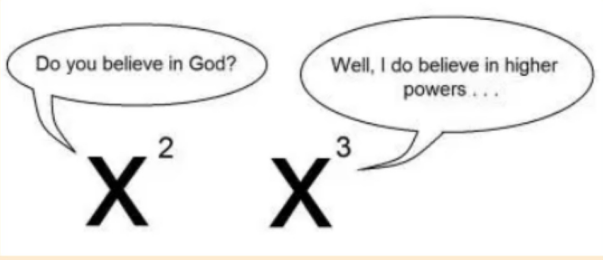
$$5y = x + 6$$

$$\begin{array}{r} 5y = x + 6 \\ -x \quad -x \\ \hline 5y - x = 6 \end{array}$$

DISCUSSION

What is the gradient of a line with general form $Ax + By = C$?

Joke Break!



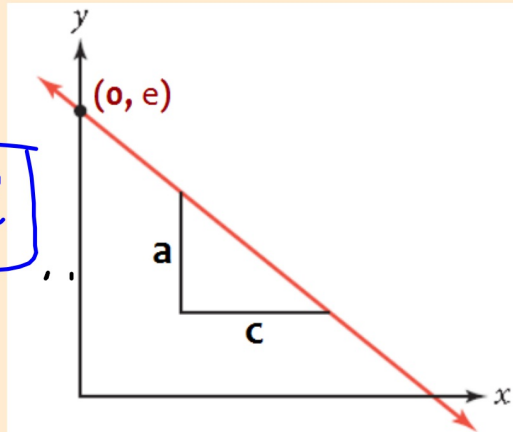
Example:

- **a** and **c** are the lengths of the vertical and horizontal segments
- $(0, e)$ is the y-intercept $Cy \text{ tax} = ce$

Write the equation of the line.

$$\text{Slope} = -\frac{a}{c}$$

$$y = -\frac{a}{c}x + e$$



F

GRAPHING LINES FROM EQUATIONS

How many points of a line do we need in order to graph it?

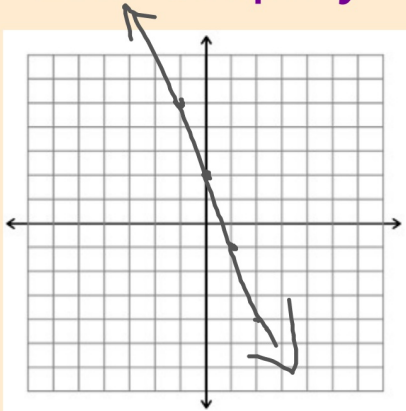


GRAPHING LINES IN GRADIENT-INTERCEPT FORM

To draw the graph of $y = mx + c$ we:

- Use the y -intercept c to plot the point $(0, c)$.
- Use x and y -steps from the gradient m to locate another point on the line.
- Join the two points and extend the line in either direction.

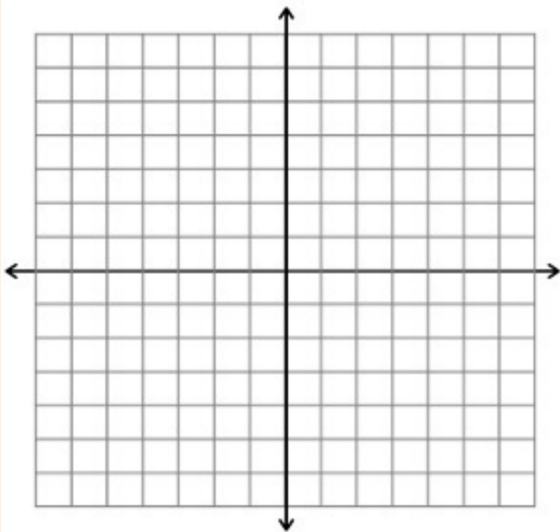
Ex.: Graph $y = -3x + 2$



$$\text{Slope} = \frac{-3 \text{ dn}}{1 \text{ rt}}$$
$$\left(\frac{\text{Up } 3}{\text{left } 1} \right)$$

GRAPHING LINES IN GRADIENT-INTERCEPT FORM

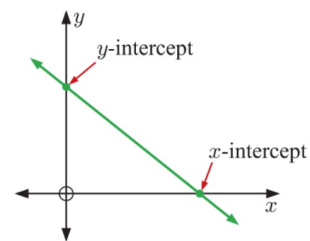
Ex.: Graph $y = -3x + 2$



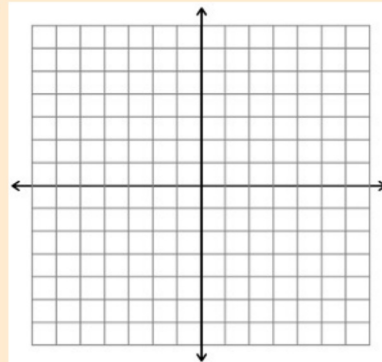
GRAPHING LINES IN GENERAL FORM

To draw the graph of a line in the general form $Ax + By = C$, we:

- Find the y -intercept by letting $x = 0$.
- Find the x -intercept by letting $y = 0$.
- Join the points where the line cuts the axes and extend the line in either direction.

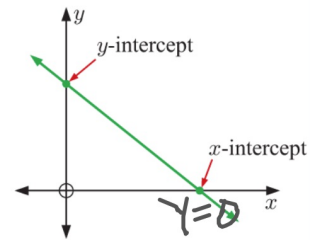
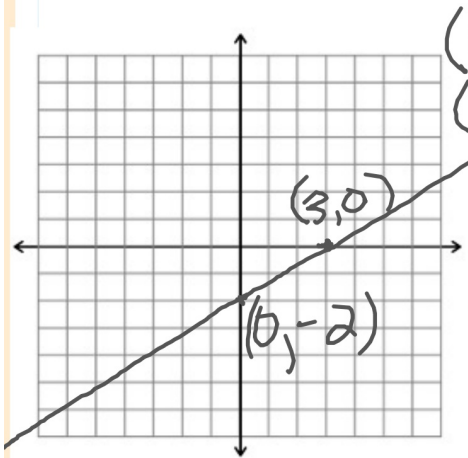


Ex.: Graph $2x - 3y = 6$



GRAPHING LINES IN GENERAL FORM

Ex.: Graph $2x - 3y = 6$



$$\begin{aligned}x &= 0 & -3y &= 6 \\y &= 0 & \frac{2x}{2} &= \frac{6}{2} \\y &= -2 & x &= 3\end{aligned}$$

Exercises for tonight:

8E.1 #2, 3 (a-c,d-f), 4(a-b,c-f)

Need Graph Paper!

8F.1 #1(a,c,f,h), 2(a,b), 3

Challenge yourself!

Afterschool math help:

Peer tutoring until 4:30 in Garages :)

8E.1 #2, 3 (a-c,d-f), 4(a-b,c-f)

2 State the gradient and y -intercept of the line with equation:

a $y = 2x + 5$

b $y = -6x - 1$

c $y = \frac{3}{5}x - \frac{2}{5}$

d $y = 10 - x$

e $y = 1 - 4x$

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

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

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

i $y = \frac{6-7x}{9}$

3 Write the following equations in general form:

a $y = -2x + 11$

b $y = 3x - 4$

c $y = -\frac{1}{5}x + \frac{6}{5}$

d $y = -\frac{6}{7}x + \frac{5}{7}$

e $y = \frac{5}{8}x - \frac{1}{8}$

f $y = \frac{4}{9}x + 2$

4 For each of the following lines:

i write the equation in gradient-intercept form

ii state the gradient of the line.

a $3x + y = 5$

b $2x + 5y = 10$

c $7x + 4y = -9$

d $6x - y = 1$

e $5x - 11y = 2$

f $9x - 2y = -5$

8F.1 #1(a,c,f,h), 2(a,b), 3

1 Draw the graph of:

a $y = 2x + 1$

b $y = 3x - 1$

c $y = \frac{2}{3}x$

d $y = \frac{4}{3}x - 2$

e $y = -x + 4$

f $y = -2x + 2$

g $y = -\frac{1}{2}x - 1$

h $y = -\frac{2}{5}x - 3$

2 Draw the graph of:

a $x + 3y = 6$

b $3x - 2y = 12$

c $2x + 5y = 10$

d $4x + 3y = 6$

e $x + y = 5$

f $x - y = -3$

g $3x - y = -6$

h $7x + 2y = 14$

i $4x + 9y = -18$

3 Consider the line with equation $y = -\frac{2}{3}x + 4$.

a Find the: **i** gradient **ii** y -intercept.

b Determine whether the following points lie on the line:

i $(-3, 6)$

ii $(2, 2)$

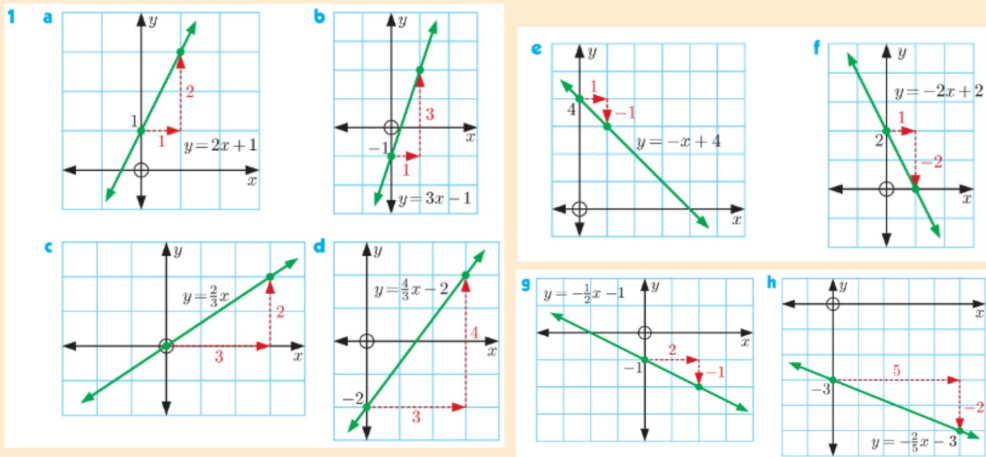
iii $(8, -\frac{4}{3})$

c Draw the graph of the line, showing your results from **a** and **b**.

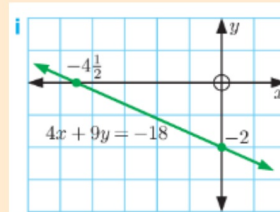
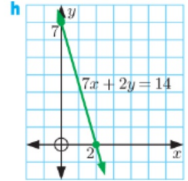
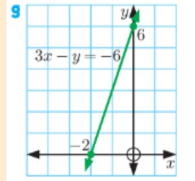
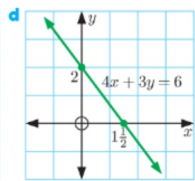
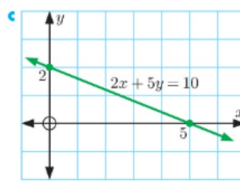
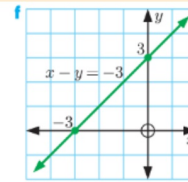
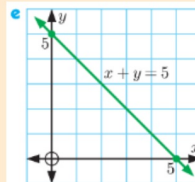
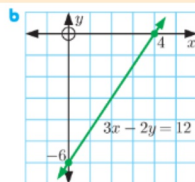
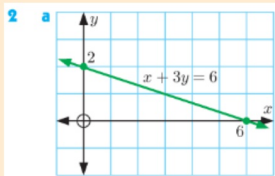
8E.1 Answers

- 2** **a** yes **b** no **c** no **d** yes
- 3** **a** $c = 4$ **b** $c = -2$ **c** $m = \frac{1}{5}$ **d** $a = -2$
- 4** **a** $k = 11$ **b** $k = 19$ **c** $k = -4$ **d** $k = 10$
e $k = -6$
- 5** **a** above, $(5, -2)$ is above $(5, -7)$.

8E.1 Answers



8E.1 Answers



8E.1 Answers

- 3 a**
- i** $-\frac{2}{3}$
 - ii** 4
- b**
- i** yes
 - ii** no
 - iii** yes

