

5.3 Practice A (introduction point-slope equation)

Date Dec, 2023 Period _____

P/S $y - y_1 = m(x - x_1)$

Write the point-slope equation of the line through the given point with the given slope.

1) through: (2, 3), slope = $\frac{5}{2}$

P/S: $y - 3 = \frac{5}{2}(x - 2)$

2) through: (-4, -2), slope = $-\frac{3}{2}$

P/S: $y + 2 = -\frac{3}{2}(x + 4)$

3) through: (-5, 2), slope = $-\frac{3}{4}$

mental step $\rightarrow y - (2) = -\frac{3}{4}(x - (-5))$

P/S: $y - 2 = -\frac{3}{4}(x + 5)$

From the point slope equation identify the slope (m=) and point (,).

P/S $y + 3 = \frac{7}{2}(x + 2)$

$m = 7/2$

pt (-2, -3)

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

$m = -2/5$

pt (5, 2)

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

$m = -4/5$

pt (5, -3)

What is this point?
y-int
B=2

Write the point-slope form of the equation of the line through the given points (use 1st point for your point-slope equation).

7) through: (5, 2) and (-2, 4)

$m = \frac{2-4}{5-(-2)} = \frac{-2}{7}$

$m = -\frac{2}{7}$

P/S $y - 2 = -\frac{2}{7}(x - 5)$

8) through: (3, -2) and (0, 2)

$m = \frac{-2-2}{3-0} = \frac{-4}{3}$

$m = -4/3$

P/S $y + 2 = -\frac{4}{3}(x - 3)$

STEP 1
Find m

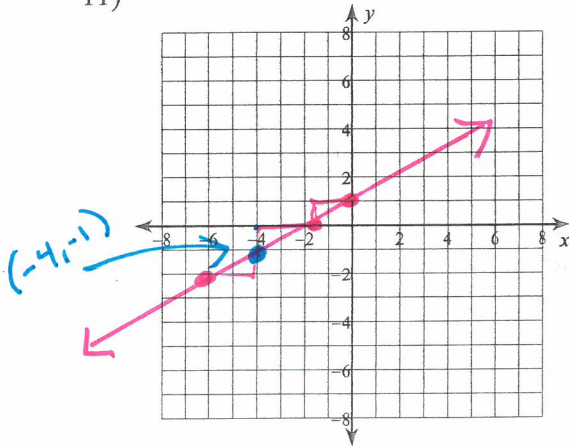
STEP 2
Use pt 1 +
put in P/S

Use the point-slope equation to graph the line; then look at the graph to write the slope-intercept equation AND state the slope and yintercept (with the correct variable names)

9) $y + 1 = \frac{1}{2}(x + 4)$ $\rightarrow m = \frac{1}{2}$
 $\rightarrow pt (-4, -1)$

10) $y - 3 = -\frac{2}{5}(x + 5)$ $m = -\frac{2}{5}$
 $pt (-5, 3)$

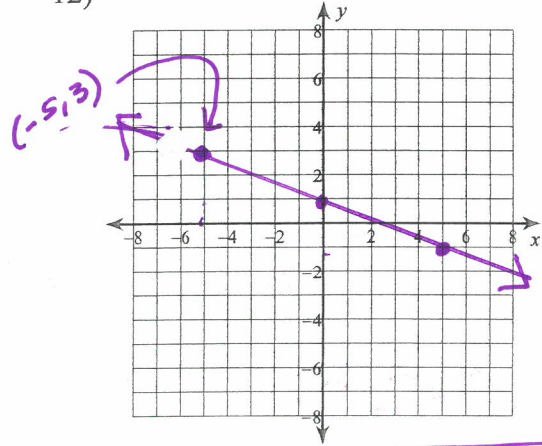
11)



S/IEQ: $y = \frac{1}{2}x + 1$

$m = \frac{1}{2}$
 $b = 1$

12)



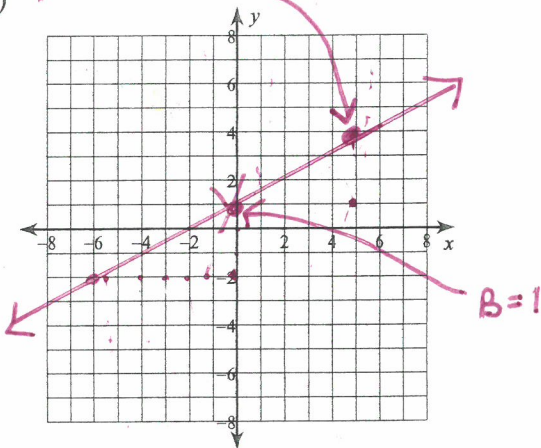
S/IEQ: $y = -\frac{2}{5}x + 1$

$m = -\frac{2}{5}$
 $b = 1$

13) $y - 4 = \frac{3}{5}(x - 5)$

$m = \frac{3}{5}$

15) $pt (5, 4)$



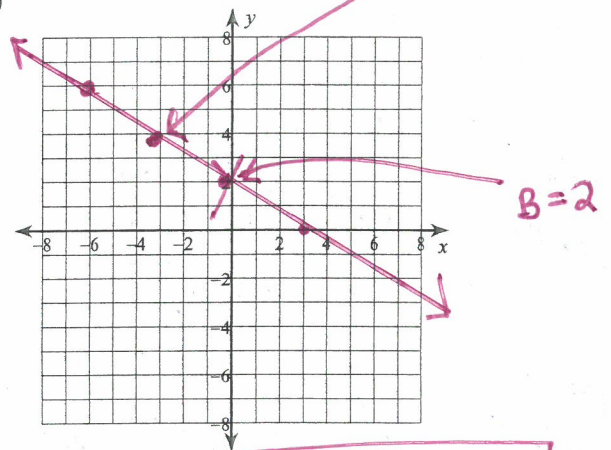
S/IE $y = \frac{3}{5}x + 1$

14) $y - 4 = -\frac{2}{3}(x + 3)$

$m = -\frac{2}{3}$

$pt (-3, 4)$

16)



S/IE $y = -\frac{2}{3}x + 2$

P/S: $y - y_1 = m(x - x_1)$

5.3 Practice B (point-slope to slope-intercept eq)

Write the slope-intercept form of the equation of the line through the given point with the given slope.

1) through: $(-5, -2)$, slope = $-\frac{3}{5}$
 P/S $y + 2 = -\frac{3}{5}(x + 5)$

isolate y

$y + 2 = -\frac{3}{5}x - 3$
 \downarrow
 S/I $y = -\frac{3}{5}x - 5$

2) through: $(5, 3)$, slope = $-\frac{1}{5}$
 P/S: $y - 3 = -\frac{1}{5}(x - 5)$

$y - 3 = -\frac{1}{5}x + 1$
 $+3$

S/I $y = -\frac{1}{5}x + 4$

3) through: $(4, -2)$, slope = $-\frac{7}{4}$
 P/S $y + 2 = -\frac{7}{4}(x - 4)$

$y + 2 = -\frac{7}{4}x + 7$
 -2

S/I $y = -\frac{7}{4}x + 5$

Write the slope-intercept form of the equation of the line through the given points.

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

STEP 1

$m = \frac{2+1}{-4+2} = -\frac{3}{2}$ $m = -\frac{3}{2}$

STEP 2

P/S $y - 2 = -\frac{3}{2}(x + 4)$
 $y - 2 = -\frac{3}{2}x - 6$
 $+2$

STEP 3

S/I $y = -\frac{3}{2}x - 4$

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

STEP 1

$m = \frac{-3-1}{-2+4} = -\frac{4}{2}$

$m = -2$

STEP 2

P/S $y + 3 = -2(x + 2)$
 $y + 3 = -2x - 4$
 -3

STEP 3

S/I $y = -2x - 7$

6) through: $(0, -3)$ and $(3, -1)$

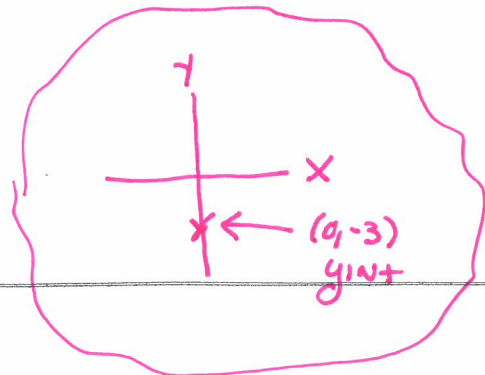
STEP 1

$m = \frac{-3+1}{0-3} = -\frac{2}{-3}$
 $m = \frac{2}{3}$

STEP 2

$(0, -3)$ is the yint (b)

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





5.3 Practice (H&V Lines) ABBREVIATED

(1) Find the slope of the line through each pair of points; (2) then state if the line is horizontal, vertical, or neither.

1) (20, 9), (-16, 9)

$$m = \frac{9-9}{20-(-16)} = \frac{0}{36}$$

$m = 0$ → HLINE

2) (18, 2), (18, 5)

$$m = \frac{2-5}{18-18} = \frac{-3}{0}$$

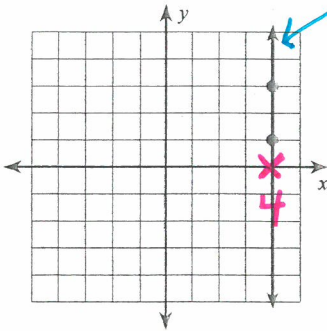
$m = \text{UNDEFINED}$ → VLINE

3) skip

4) skip

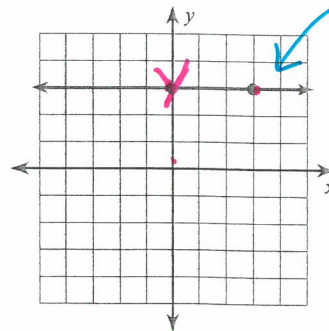
Find the slope of each line. Label with the correct variable notation.

5)



Vertical Line
EQ VLINE: $x=4$
 $m = \frac{2}{0}$
 $m = \text{UNDEFINED}$

6)



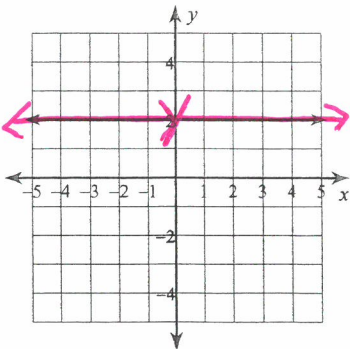
HORIZONTAL LINE
EQ HLINE: $y=3$
 $m = \frac{0}{3}$
 $m = 0$

7) skip

8) skip

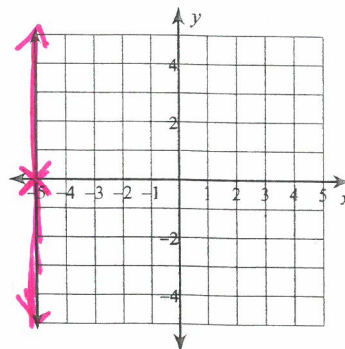
Write the equation of each line.

9)



$y = 2$

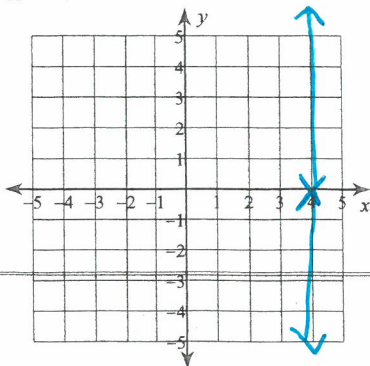
10)



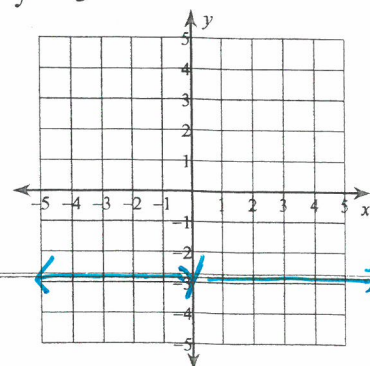
$x = -5$

Graph each line:

11) $x = 4$



12) $y = -3$





5.4 Graph Linear Equations in Standard Form

VOCABULARY:

- Slope-intercept form (S/I) $y = mx + b$ $m = \text{slope}$ $b = \text{y-int}$ (0, b)
- Point-Slope form (P/S) $y - y_1 = m(x - x_1)$ $m = \text{slope}$ point (x_1, y_1)
- Standard form $AX + BY = C$
- Where A, B, C are INTEGERS (NO FRACTIONS/Decimals)
- What would be the easiest method to graph an equation in Standard form?

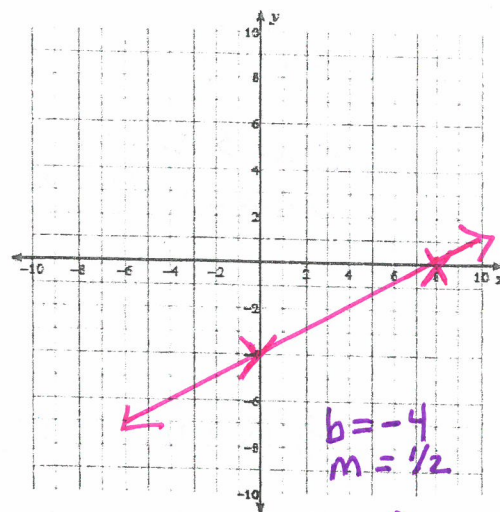
Use the intercept method to Graph.

Example 1 Graph an equation using Standard Form

a) Graph: $3x - 6y = 24$

X, INT: $x: 8$ $(8, 0)$

Y, INT: $y: -4$ $(0, -4)$



b) Rewrite the equation in slope-intercept form. $\rightarrow y = mx + b$

$$\begin{array}{r} 3x - 6y = 24 \\ -3x \quad -3x \\ \hline -6y = -3x + 24 \\ \hline -6 \quad -6 \quad -6 \\ \hline y = \frac{1}{2}x - 4 \end{array}$$

S/I: $y = \frac{1}{2}x - 4$

Does this equation match the graph?
Yes, the slope + y-intercept match!

CONCLUSION:

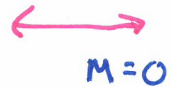
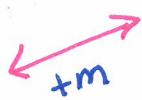
$$\begin{array}{l} 3x - 6y = 24 \\ y = \frac{1}{2}x - 4 \end{array}$$

Describe the same line

Review Graphing Lines

TO FIND SLOPE

① Given a graph $\rightarrow m = \frac{\text{RISE}}{\text{RUN}}$



② Given 2 points $\rightarrow m = \frac{\Delta Y}{\Delta X} = \frac{Y_2 - Y_1}{X_2 - X_1}$

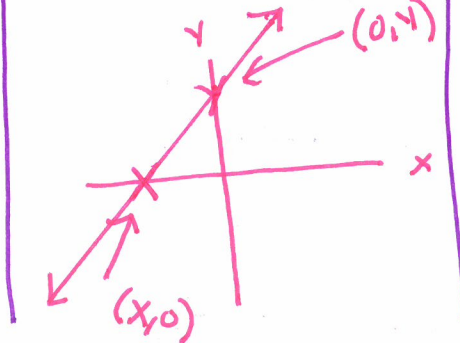
3 METHODS TO GRAPH LINES

① Table Method



* Pick 3 EASY VALUES FOR X

② INTERCEPT METHOD



③

SLOPE INTERCEPT METHOD

$$y = mx + b$$

$m = \text{slope}$

$b = y \text{ INTERCEPT}$

3 FORMS TO WRITE LINEAR EQUATIONS

① SLOPE-INTERCEPT (S/I) $\rightarrow y = mx + b$

② POINT-SLOPE (P/S) $\rightarrow Y - y_1 = m(X - x_1)$
where $m = \text{slope}$ Given point (x_1, y_1)

③ STANDARD FORM $\rightarrow Ax + By = C$

A, B, C are integers