

Key

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WIN week 3 day 1 writing equations of lines in slope intercept form

Learning Target – students will write equations of lines in slope intercept form.

The equation of a line in **slope intercept form** is $y = mx + b$, where m = slope and b = y intercept.

1. Write the equation of a line with a slope of 3 and a y intercept of 5.

$$y = 3x + 5$$

2. Explain what the slope and y intercept tell you about the line in question 1.

- (0,5) is the point where the line crosses the y-axis.
- 3 is the slope – rise of 3 and run of 1.

Practice. For each question, write the equation of the line and tell what the slope and y intercept tell you about the line.

25) Slope = $-\frac{6}{5}$, y-intercept = 1

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

27) Slope = $-\frac{4}{3}$, y-intercept = 0

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

29) Slope = -1, y-intercept = 0

$$y = -x$$

26) Slope = -1, y-intercept = 5

$$y = -x + 5$$

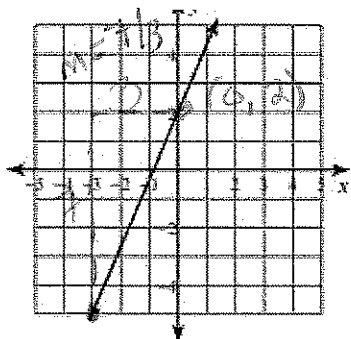
28) Slope = $\frac{4}{3}$, y-intercept = 2

$$y = \frac{4}{3}x + 2$$

30) Slope = $-\frac{3}{4}$, y-intercept = 4

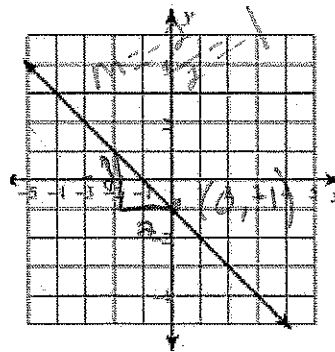
$$y = -\frac{3}{4}x + 4$$

3. Write the equation of the line in the graph below.



A.

$$y = \frac{1}{3}x + 2$$



B.

$$y = -x - 1$$

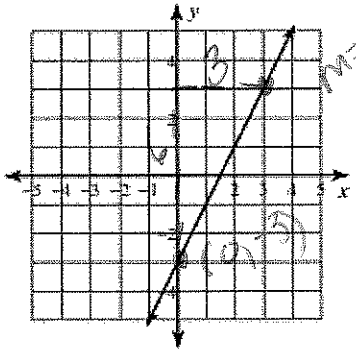
145 - 5's

93 - 1's

5880 - 20's

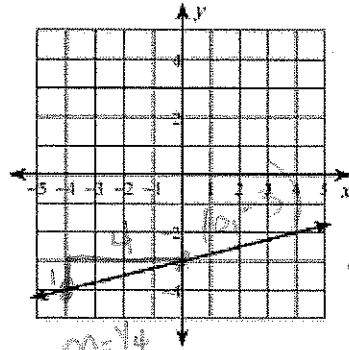
Practice: Write the equation of each line.

5)



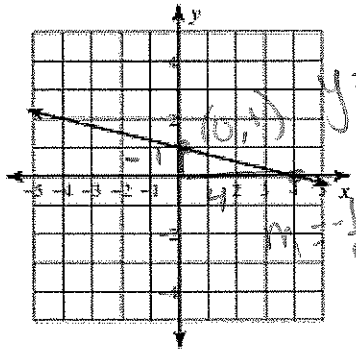
$m = \frac{4}{2} = 2$
 $y = 2x - 3$

6)



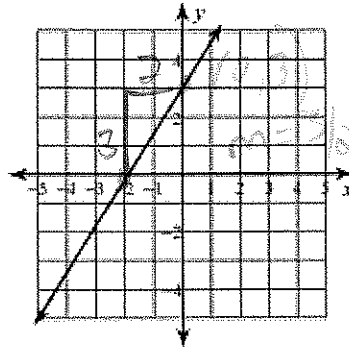
$m = \frac{1}{4}$
 $y = \frac{1}{4}x - 3$

7)



$m = -\frac{1}{4}$
 $y = -\frac{1}{4}x + 1$

8)



$m = \frac{2}{2} = 1$
 $y = \frac{3}{2}x + 3$

Sometimes you are not given the slope or the y intercept, so you have to find them before you write the equation.

4. Write the equation of a line in slope intercept form with a slope of 2 through the point (5, -3).

1.) you need b
 $y = mx + b$
 $-3 = 2(5) + b$
 $-3 = 10 + b$
 $-10 \quad -10$
 $-13 = b$

2.) write the equation
 so $y = 2x - 13$

Practice – write the equation of each line in slope intercept form.

101) through: (3, 3), slope = 2

$3 = 2(3) + b$
 $3 = 6 + b$
 $-6 \quad -6$
 $-3 = b$
 $y = 2x - 3$

103) through: (-2, 0), slope = $-\frac{3}{2}$

$0 = -\frac{3}{2}(-2) + b$
 $0 = -3 + b$
 $+3 \quad +3$
 $3 = b$
 $y = -\frac{3}{2}x + 3$

102) through: (5, 5), slope = $\frac{8}{5}$

$5 = \frac{8}{5}(5) + b$
 $5 = 8 + b$
 $-3 = b$
 $y = \frac{8}{5}x - 3$

104) through: (-1, 3), slope = 1

$3 = 1(-1) + b$
 $3 = -1 + b$
 $+1 \quad +1$
 $4 = b$
 $y = x + 4$

5. Write the equation of a line in slope intercept form through the points $(-3, -1)$ and $(-2, -2)$

1.) Find m :

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

2.) Find b
 $y = mx + b$
 $-1 = -1(3) + b$
 $-1 = -3 + b$
 $+3 \quad +3$
 $2 = b$

3.) $y = -x + 2$
write the equation

Practice:

123) through: $(5, -3)$ and $(-3, 3)$

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

125) through: $(4, 4)$ and $(0, -1)$

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

123) $m = \frac{3 - (-3)}{-3 - 5} = \frac{6}{-8} = -\frac{3}{4}$

$$y = mx + b$$

$$3 = -\frac{3}{4}(3) + b$$

$$3 = -\frac{9}{4} + b$$

$$\frac{+9}{4} \quad \frac{+9}{4}$$

$$\frac{21}{4} = b$$

$$y = -\frac{3}{4}x + \frac{21}{4}$$

124) y intercept
 $b = -1$
 $m = \frac{-3 - (-1)}{1 - 0} = \frac{-2}{1} = -2$

$$y = -2x - 1$$

125) y intercept
 $b = -1$
 $m = \frac{-1 - 4}{0 - 4} = \frac{-5}{-4} = \frac{5}{4}$

$$y = \frac{5}{4}x - 1$$

126) $m = \frac{-4 - 1}{-1 - (-1)} = \frac{-5}{0} = \text{undefined}$
 $x = -1$

Win week 3 day 2 warm up

1. Write the equation of a line in slope intercept form with a slope of $\frac{3}{2}$ and a y intercept of -4.

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

2. Write the equation of a line in slope intercept form with a slope of -2 through the point (-1,3).

$$y = mx + b$$

$$3 = -2(-1) + b$$

$$3 = 2 + b$$

$$\begin{array}{r} -2 \\ -2 \end{array}$$

$$1 = b$$

$$y = -2x + 1$$

3. Write the equation of a line in slope intercept form through the points (-4,-3) and (4,2).

$$m = \frac{2 - (-3)}{4 - (-4)} = \frac{5}{8}$$

$$2 = \frac{5}{8}(4) + b$$

$$2 = \frac{5}{2} + b$$

$$\begin{array}{r} -\frac{5}{2} \\ -\frac{5}{2} \end{array}$$

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

$$y = \frac{5}{8}x - \frac{1}{2}$$

4. Check this with Mrs. Blanton and then Kahn academy work day.

Win week 3 day 3 writing equations of lines in point slope form

Students will write equations of lines in point slope form.

Another form for the equation of a line is **point slope form** $y - y_1 = m(x - x_1)$ where m is the slope and (x_1, y_1) is a point on the line. This form of the equation of a line is easier to use when you are given a point and slope and can be converted into slope intercept form.

1. Write the equation of a line in point slope form with a slope of 3 through the point $(-2, 1)$.

$$y - 1 = 3(x + 2)$$

Practice:

1. $(4, -3)$, $m = -1$

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

2. $(-5, -6)$, $m = 2$

$$y + 6 = 2(x + 5)$$

3. $(-7, 2)$, $m = 3$

$$y - 2 = 3(x + 7)$$

4. $(3, 5)$, $m = -2$

$$y - 5 = -2(x - 3)$$

5. $(6, -2)$, $m = -3$

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

6. $(5, -2)$, $m = 2$

$$y + 2 = 2(x - 5)$$

2. Write the point slope form of the equation of a line through the points $(-1, 3)$ and $(4, -7)$.

$$m = \frac{-7 - 3}{4 - (-1)} = \frac{-10}{5} = -2$$

$$y - 3 = -2(x - (-1))$$

or

$$y + 7 = -2(x - 4)$$

Practice:

11. (0, 8) and (-1, 10)

$$m = \frac{10-8}{-1-0} = \frac{2}{-1} = -2 \quad y-10 = -2(x+1)$$

13. (4, 5) and (-3, 8)

$$m = \frac{8-5}{-3-4} = \frac{3}{-7}$$

$$y-8 = -\frac{3}{7}(x+3)$$

15. (-1, 7), (8, -2)

$$m = \frac{-2-7}{8-(-1)} = \frac{-9}{9} = -1$$

$$y+2 = -(x-8)$$

12. (-6, 8) and (4, 8)

$$m = \frac{8-8}{4-(-6)} = 0$$

$$y = 8$$

14. (0, 9) and (2, 0)

$$m = \frac{0-9}{2-0} = -\frac{9}{2}$$

$$y-0 = -\frac{9}{2}(x-2)$$

16. (4, 0), (0, 5)

$$m = \frac{5-0}{0-4} = -\frac{5}{4}$$

$$y-5 = -\frac{5}{4}(x-0)$$

To graph the equation of a line it is helpful to convert the line to slope intercept form.

3. Write the equation of a line in point slope form through the point (-5,1) with a slope of 2. Then convert your equation to slope intercept form.

$$y-1 = 2(x+5)$$

$$y-1 = 2x+10$$

$$y = 2x+11$$

Practice – convert to slope intercept form. Name the slope and y intercept of each line.

$$63) y+3 = -4(x-2)$$

$$y+3 = -4x+8$$

$$y = -4x+5$$

$$65) y-3 = -2(x+4)$$

$$y-3 = -2x-8$$

$$y+3 = -2x-5$$

$$66) y+5 = -\frac{5}{2}(x-1)$$

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

$$y = -\frac{5}{2}x - \frac{9}{2}$$

$$y = -\frac{5}{2}x - \frac{9}{2}$$

$$64) y-3 = \frac{1}{3}(x-3)$$

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

$$y = \frac{1}{3}x + 2$$

$$y = \frac{1}{3}x + 2$$

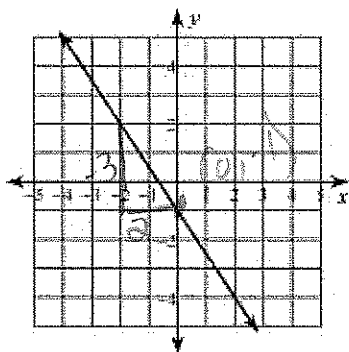
$$67) y+1 = -\frac{5}{8}(x-3)$$

$$y+1 = -\frac{5}{8}x + \frac{15}{8}$$

$$y = -\frac{5}{8}x + \frac{7}{8}$$

$$y = -\frac{5}{8}x + \frac{7}{8}$$

4. Write the equation of the given line in point slope form.



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

$$y+1 = -\frac{3}{2}(x-0)$$

Win week 3 day 4

1. Write the equation of the line through (-7, -2) and (-6, 3) in point slope form.

$$m = \frac{3 - (-2)}{-6 - (-7)} = \frac{5}{1}$$

$$y + 2 = 5(x + 7)$$

2. Convert the equation to slope intercept form.

$$y + 2 = 5x + 35$$

$$y = 5x + 33$$

3. Name the slope and y intercept of the equation.

$m = 5$
y intercept (0, 33)

4. Check this in with Mrs. Blanton and then kahn academy work day.

Win week 3 day 5 Standard form

Students will convert equations of lines to standard form.

The equation of a line in standard form is $Ax+By=C$. The following must be true

- No fractions or decimals
- A must be positive
- The GCF of A, B and C must equal 1.

Examples

$$1. y = \frac{4}{5}x - 5 \quad 2. 2x = 4y + 8$$

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

$$4x - 5y = 25 \quad x - 2y = 4$$

$$3. y - 1 = \frac{2}{3}(x - 4)$$

$$y - 1 = \frac{2}{3}x - \frac{8}{3}$$

$$+1 \quad +1$$

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

$$-3 \left(-\frac{2}{3}x + y = -\frac{5}{3} \right)$$

$$2x - 3y = 5$$

Practice:

Convert each equation to STANDARD FORM.

$$17) y - 5 = -3(x + 2)$$

$$y - 5 = -3x - 6$$

$$+5 \quad +5$$

$$y = -3x - 1$$

$$3x + y = -1$$

Remainder

$$~~19) 0 = x - 4~~$$

$$18) y + 1 = \frac{4}{5}(x - 5)$$

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

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

$$-5 \left(-\frac{4}{5}x + y = -5 \right)$$

$$4x - 5y = 25$$

$$20) y - 3 = -\frac{1}{2}(x + 4)$$

$$y - 3 = -\frac{1}{2}x - 2$$

$$+3 \quad +3$$

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

$$2 \left(\frac{1}{2}x + y = 1 \right)$$

$$x + 2y = 2$$

Write each equation in STANDARD FORM. (Hint: Write in slope-intercept form, then convert to standard form.)

9) Slope = $\frac{3}{5}$, y-intercept = 5

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

$$-5 \left(-\frac{3}{5}x + y = 5 \right)$$

$$3x - 5y = -25$$

11) Slope = $-\frac{3}{5}$, y-intercept = -3

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

$$5 \left(\frac{3}{5}x + y = -3 \right)$$

$$3x + 5y = -15$$

Write each equation in STANDARD FORM. (Hint: Write in point-slope form first, then convert to STANDARD FORM.)

25) through: (5, 0), slope = -1

$$y - 0 = -1(x - 5)$$

$$y = -x + 5$$

$$x + y = 5$$

27) through: (-3, -4), slope = $-\frac{1}{3}$

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

$$y + 4 = -\frac{1}{3}x - 1$$

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

$$3 \left(\frac{1}{3}x + y = -5 \right)$$

$$x + 3y = -15$$

10) Slope = 1, y-intercept = -3

$$y = x - 3$$

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

$$x - y = -3$$

12) Slope = $\frac{5}{4}$, y-intercept = 2

$$y = \frac{5}{4}x + 2$$

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

$$-5x + 4y = 8$$

26) through: (2, -5), slope = -4

$$y + 5 = -4(x - 2)$$

$$y + 5 = -4x + 8$$

$$y = -4x + 3$$

$$4x + y = 3$$

28) through: (3, 0), slope = $-\frac{2}{3}$

$$y - 0 = -\frac{2}{3}(x - 3)$$

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

$$3 \left(\frac{2}{3}x + y = 2 \right)$$

$$2x + 3y = 6$$