

## Writing equations given m and b or m and a point

$$\text{Slope-Intercept Form: } y = mx + b$$

To write an equation in Slope-Intercept Form, you must know m and b.

Write an equation in Slope-Intercept Form.

1)  $m = -\frac{2}{3}$  and  $b = 4$

Replace m and b with the respected values:  $y = -\frac{2}{3}x + 4$

2)  $m = 1$  and  $b = -14$

Replace m and b with the respected values:  $y = x - 14$

Remember  $1x = x$ . Do NOT write the one.

Remember  $x + -14 = x - 14$ . Do NOT write double signs.

3)  $m = 2$  and  $(-5, -16)$

If you are given an ordered pair, you know x and y. So replace x with -5, y with -16 and m with 2 in  $y = mx + b$  and solve for b.

$$y = mx + b$$

$$-16 = 2(-5) + b$$

$$-16 = -10 + b$$

$$+10 \quad +10$$

$$-6 = b$$

Since  $m = 2$  and  $b = 6$ , the equation is  $y = 2x - 6$

Remember,  $(-5, -16)$  lies on the line  $y = 2x - 6$ . You can check this ordered pair by replacing x and y in the equation. You are right if it comes out true.

Standard Form:  $Ax + By = C$  where  $A, B, C$  are integers and  $A$  is positive

Transform the equation into standard form.

4)  $y = 9x - 2$

An equation in standard form has  $x$  and  $y$  on the same side and the  $x$  term is first. So, we want to subtract  $9x$  from both sides.

$$\begin{aligned} y &= 9x - 2 \\ -9x &\quad -9x \\ -9x + y &= -2 \end{aligned}$$

This is not the final answer because equation in standard form can not have a negative  $A$  value. To change the sign of a number, divide every term by  $-1$ . (Or you can multiply every term by  $-1$ .)

$$\begin{aligned} -9x + y &= -2 \\ -1 \quad -1 \quad -1 \\ \boxed{9x - y = 2} \end{aligned}$$

Write an equation in standard form.

5)  $m = \frac{2}{5}$  and  $(-15, 1)$

The first thing we need to do is write the equation in slope intercept form. Then we will transform it into standard form. To write an equation in slope intercept form we need to know  $m$  and  $b$ . We have  $m$  and a point. So we will plug into  $y = mx + b$  the values of  $m$ ,  $x$  and  $y$  to solve for  $b$ .

$$\begin{aligned} y &= mx + b \\ 1 &= \frac{2}{5}(-15) + b \\ 1 &= -6 + b \\ +6 \quad +6 \\ 7 &= b \end{aligned}$$

Knowing that  $m = \frac{2}{5}$  and  $b = 7$ , the slope intercept equation is

$y = \frac{2}{5}x + 7$ . Now we have to transform that into standard form.

Remember  $x$  and  $y$  need to be on the same side so we will subtract  $\frac{2}{5}x$  from both sides.

$$y = \frac{2}{5}x + 7$$

$$-\frac{2}{5}x \quad -\frac{2}{5}x$$

$$-\frac{2}{5}x + y = 7$$

This equation is NOT in standard form because there is a fraction and A is negative. To get rid of the fraction, multiply every term by the LCD. To get rid of the negative, the number you multiply by should be negative. The LCD here is 5, so we will multiply by -5.

$$-5(-\frac{2}{5}x) + -5(y) = -5(7)$$

$$\boxed{2x - 5y = -35}$$

You can check by replacing x and y with (-15, 1).

$$2(-15) - 5(1) = -35$$

$$-30 - 5 = -35$$

$$-35 = -35$$