## 5.1: Write Linear Equations in Slope - intercept form

Goals: $\quad$ *Write an equation in slope - intercept form given slope and $y$-int.
*Write an equation in slope - intercept form given two points
*Write an equation in slope - intercept form given two function values

## Slope - intercept form:

$$
y=m x+b
$$

Situation 1: Write the equation of a line in slope - intercept form if given slope and the $y$-intercept
Since you are told the slope and $y$-intercept, simply replace $m$ with the slope and $b$ with the $y$-intercept. Simplify if necessary/possible.

Ex:
Slope: - 2
$y$ - intercept: 5

$$
y=-2 x+5
$$

Ex:

Slope: $\frac{3}{4}$
$y$ - intercept: -3
$y=\frac{3}{4} x-3$

## Ex:

Slope: 8
$y$ - intercept: -7

$$
y=8 x-7
$$

## Ex:

Slope: 0
$y$-intercept: 5

$$
y=5
$$

Ex:
Slope: 4
$y$ - intercept: -3

$$
y=4 x-3
$$

Ex:
Slope: -1
$y$-intercept: 0

$$
y=-x
$$

Situation 2: Write the equation of a line in slope - intercept form if given two points on the line

1. Find the slope using the formula:

$$
m=\frac{y_{2}-y_{1}}{x_{2}-x_{1}}
$$

$$
\begin{aligned}
& \text { Ex: }(0,-5)(3,-1) \\
& m=\frac{4}{3}
\end{aligned}
$$

2. Recall that the $y$-intercept happens when $x$ is 0

$$
b=-5
$$

(So in this case $b=-5$ since that is the value when $x=0$ )
3. Plug in $m$ and $b$ into $y=m x+b$

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

Ex: $(0,2)(4,-1)$

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

Ex: $(0,1)(4,-1)$
$y=-1 / 2 x+1$

Ex:


$$
y=-x+2
$$

Ex: $(0,5)$ and $(4,17)$

$$
\begin{aligned}
& m=3 \\
& b=5 \\
& y=3 x+5
\end{aligned}
$$

Ex: $(-3,6)$ and $(0,5)$

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

Ex: $(0,-2)$ and $(8,4)$

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

Ex: $(0,7)$ and $(3,1)$

$$
y=-2 x+7
$$

Ex: A recording studio charges musicians an initial fee of $\$ 50$ to record an album. Studio time costs an additional $\$ 35$ per hour.
$x$ : \# hours $y$ : Total cost
a) Write an equation that gives the total cost to record an album as a function of studio time needed.

$$
y=35 x+50
$$

b) Find the total cost to make an album that takes 10 hours to record.

$$
\begin{aligned}
& y=35(10)+50 \\
& y=400
\end{aligned}
$$

Ex: A dance studio charges $\$ 20$ to use the facility and $\$ 25$ per hour of instruction.
$x$ : \# hours
$y$ : Total cost
a) Write an equation that gives the total cost as a function of hours of dance instruction.

$$
y=25 x+20
$$

b) Find the total cost for 2 hours of dance instruction.

$$
\begin{aligned}
& y=25(2)+20 \\
& y=70
\end{aligned}
$$

