## 5.5: Write Equations of Parallel and Perpendicular Lines

Goals: *Write an equation in slope - intercept of parallel lines
*Write an equation in slope - intercept form of perpendicular lines

Parallel Lines: lines that never intersect
Symbol: ||
Parallel lines have the same slope

## Write the equation of the line with the given information:

Ex: passes through $(-3,-5)|\mid$ to $y=3 x-1$

## Given Equation

What information do you know from the given equation?

The given line has a slope of 3

Ex: passes through $(-2,11)|\mid$ to $y=-x+5$

$$
y=-x+9
$$

Ex: passes through $(-3,3)|\mid$ to $y+2 x=1$

$$
y=-2 x-3
$$

## Answer Equation

What information can you infer about the answer equation as a result?

The answer line will also have a slope of 3 since they are parallel.

$$
\begin{aligned}
& y=m x+b \\
& -5=3(-3)+b \\
& -5=-9+b \\
& +9 \quad+9 \\
& \hline 4=b \\
& y=3 x+4
\end{aligned}
$$

Determine which lines, if any, are parallel:
1.
a. $y=5 x-3$
b. $x+5 y=2$
c. $-10 y-2 x=0$
$m=5$
$m=-\frac{1}{5}$
$m=-\frac{1}{5}$
b || c
2.
a. $y=-3 x+1$
$m=-3$
b || c
3.
a. $2 x+6 y=-3$
$m=-\frac{1}{3}$
b. $y=3 x-8$
$m=3$
c. $-1.5 y+4.5 x=6$
$m=3$
b || c
b. $-x+3 y=1$
$m=\frac{1}{3}$
$m=\frac{1}{3}$
c. $2 x-6 y=4$

