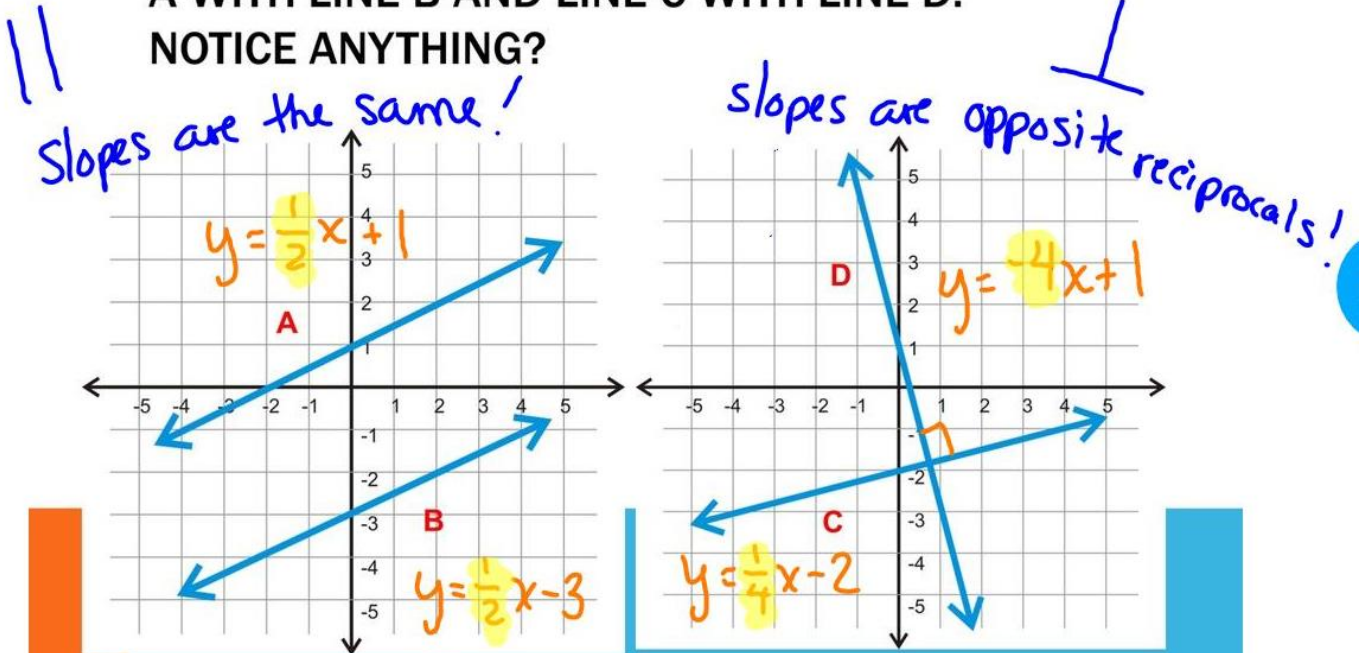


## Parallel and Perpendicular Lines

COMPARE YOUR LINEAR EQUATIONS FOR LINE A WITH LINE B AND LINE C WITH LINE D.  
NOTICE ANYTHING?



### PARALLEL LINES

Two lines that are parallel will always have the same slope but different y-intercepts.

### PERPENDICULAR LINES

Two lines that are perpendicular will have slopes that are the opposite reciprocals of each other.

**WHY DO YOU THINK THIS IS THE CASE?**

DETERMINE IF THE TWO LINES ARE PARALLEL, PERPENDICULAR, OR NEITHER.

1)  $y = 4x - 3$  and  $4x - y = 7 - 4x$

$$\begin{aligned} & \frac{-4x}{-4x} \\ (-1) \times y &= (-4x + 7)(-1) \\ y &= 4x - 7 \end{aligned}$$

Parallel - have the same slope!

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

$$\begin{aligned} & \frac{-2x}{-2x} \quad \frac{-2x}{-2x} \\ \frac{3y}{3} &= \frac{6-2x}{3} \quad y = 2 - \frac{2}{3}x \end{aligned} \quad \text{--- Neither}$$

3)  $16x + 2y = 22$  and  $y = \frac{1}{8}x - 1$

$$\begin{aligned} & \frac{-16x}{-16} \\ 2y &= -16x + 22 \\ y &= -8x + 11 \end{aligned}$$

Perpendicular

WRITE THE EQUATION OF THE LINE THAT PASSES THROUGH THE GIVEN POINT AND IS PARALLEL TO THE GIVEN LINEAR EQUATION.

1)  $(5, -1)$ ;  $y = -\frac{3}{5}x - 3$

2)  $(-10, 0)$ ;  $3x - y = 16$

$$y = 3x + 30$$

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

$$-1 = -\frac{3}{5}(5) + b$$

$$\begin{aligned} -1 &= -3 + b \\ +3 & \quad +3 \\ 2 &= b \end{aligned}$$

$$y = 3x - 16$$

$$y = 3x + b$$

$$0 = 3(-10) + b$$

$$0 = -30 + b$$

$$30 = b$$

$$\begin{aligned} 2 &= b \\ y + 1 &= -\frac{3}{5}(x - 5) \end{aligned}$$

$$\begin{aligned} y &= 3(x + 10) \\ y &= 3x + 30 \end{aligned}$$

WRITE THE EQUATION OF THE LINE THAT PASSES THROUGH THE GIVEN POINT AND IS PERPENDICULAR TO THE GIVEN LINEAR EQUATION.

1)  $(-9, 2)$ ;  $y = 3x - 12$

2)  $(-4, -1)$ ;  $3y - 4x = 18$

opposite reciprocal =  $-\frac{1}{3}$

$$y - 2 = -\frac{1}{3}(x + 9)$$

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

$$+2 \quad +2$$

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

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

**SOLVE.**

10. Find the Equation of a line parallel to  $y = -3$  passing through the coordinate  $(2, 6)$ .



$$y = 6$$

11. Find the Equation of a line perpendicular to  $y = -3$  passing through the coordinate  $(2, 6)$ .

$$x = 2$$

vertical

12. Find the Equation of a line parallel to  $x = 4$  passing through the coordinate  $(-2, 3)$ .

$$x = -2$$

13. Find the Equation of a line perpendicular to  $x = 4$  passing through the coordinate  $(-2, 3)$ .

$$y = 3$$