Sec 6-5: Parallel and Perpendicular Lines

Two lines are Parallel if they:
- Have the same slope
- Different y-intercepts

Two lines are Perpendicular if they:
- Have opposite reciprocal slopes
- y-intercepts don't matter

Find the opposite reciprocal of each number:

	Opposite Reciprocal
$\frac{7}{1}$	$-\frac{1}{7}$
$-\frac{1}{3}$	$+\frac{3}{1}$ or 3

	Opposite Reciprocal
2.5 $\downarrow$ $2\frac{1}{2}=\frac{5}{2}$	$-\frac{2}{5}$
-0.63 $-\frac{63}{100}$	$+\frac{100}{63}$

Is each pair of numbers opposite reciprocals?

$\frac{-2}{1}$ and $0.5 = \frac{1}{2}$ Yes

$\frac{5}{3}$ and -0.6 $\frac{6}{10} = \frac{3}{5}$ Yes

20 and -0.2 $-\frac{2}{10} = -\frac{1}{5}$ NO

Write down two numbers that are just Reciprocals.

Multiply these together. What is the result?

The product of any number and its reciprocal is 1

The product of OPPOSITE RECIPROCALS is -1

Is each pair of numbers Opposite Reciprocals?

100 and 0.01 NO, they're both pos

8 and -0.15 → $8(-.15) = -1.2 \neq -1$ NO

3.2 and -0.3125 $(3.2)(-0.3125) = -1$ yes

Is each pair of lines parallel?

1. $y = -2x + 4$ $m = -2$
   $y = -2 + 4x$ $m = 4$

Lines have different slope

NOT //

Is each pair of lines parallel?

2. $y = 3x - 7$ $m = 3$
   $y = 3$ $m = 0$

Lines have different slope

NOT //

Is each pair of lines parallel?

3. $y = -\frac{1}{2}x + 7$ $m = -1/2$ $b = 7$

$4x + 8y = 24$

$-4x \quad -4x$

$\frac{8y}{8} = \frac{24 - 4x}{8}$

$y = 3 - 1/2x$ $m = -1/2$ $b = 3$

these lines have the same slope but different y-intercepts so they

ARE PARALLEL

Is each pair of lines parallel?

4. $y = 6x - 1$ $m = 6$

$6x - 2y = 8$

$\frac{-2y}{-2} = \frac{8 - 6x}{-2}$

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

these lines have different slopes.

NOT $\parallel$

Is each pair of lines perpendicular?

1. $y = 3x - 8$

$y = -3x + 5$

NOT $\perp$

these lines don't have opposite reciprocal slopes,

Is each pair of lines perpendicular?

2. $y = 4x + 20$

$y = \frac{1}{4}x - 2$

NOT $\perp$

these lines don't have opposite reciprocal slopes,

Is each pair of lines perpendicular?

3. $y = 2x - 5$

$6x - 3y = 15$

$-6x \quad -6x$

$\frac{-3y}{-3} = \frac{15 - 6x}{-3}$

$y = -5 + 2x$

these lines don't have opposite reciprocal slopes,

NOT ⊥

Is each pair of lines perpendicular?

4. $y = 9$ Horiz

$x = 9$ Vertical

Yes ⊥

Parallel, Perendicular, or Neither?

1. $y = 1.5x + 8$ → $1.5 = \frac{3}{2}$

$y = -\frac{2}{3}x + 6$

These lines have slopes that are opposite reciprocals,

They are perpendicular

Parallel, Perendicular, or Neither?

2. $y = 6x - 7$ $m = 6$, $b = -7$

$24x - 4y = 28$

$-24x \quad -24x$

$\frac{-4y}{-4} = \frac{28 - 24x}{-4}$

$y = -7 + 6x$ $m = 6$, $b = -7$

these lines have the same slope and y-intercept, they are Neither

3. Parallel, Perendicular, or Neither?

$y = x + 3$ $\quad m = 1$

$y = -x - 5$ $\quad m = -1$

these are opposite reciprocals!

Lines are Perpendicular

4. Parallel, Perendicular, or Neither?

$y = -8x + 3$ $\quad m = -8$, $b = 3$

$16x + 2y = 11$

$y = \frac{11 - 16x}{2}$

$y = \frac{11}{2} - 8x$ $\quad m = -8$, $b = \frac{11}{2}$

These lines have the same slope but different y-intercepts

Lines are Parallel