

Parallel & Perpendicular Lines

Slope—the ratio of vertical change to horizontal change between any two points on the line

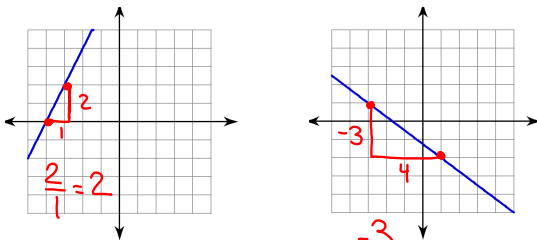
$$m = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

- horizontal lines: $m = 0$
- vertical lines: $m = \text{undefined}$

title

slope

Find the slope of each line.



finding slope

Find the slope of the line that passes through the given points.

$(-1, 8)$ and $(-9, 6)$

$$\frac{8-6}{-1-(-9)} = \frac{2}{8} = \frac{1}{4}$$

$(7, 4)$ and $(-3, 4)$

$$\frac{4-4}{7-(-3)} = \frac{0}{10} = 0$$

$(-2, 12)$ and $(-5, -3)$

$$\frac{12-(-3)}{-2-(-5)} = \frac{15}{3} = 5$$

$(10, 1)$ and $(10, 6)$

$$\frac{6-1}{10-10} = \frac{5}{0} = \text{undefined}$$

finding slope

Find the slope of the line given the equation of the line.

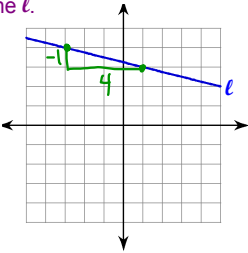
$y = -3x + 8$ -3	$y = mx + b$ Slope	$y = \frac{1}{4}x - 2$ $\frac{1}{4}$
$2x + 4y = 12$ $4y = -2x + 12$ $y = -\frac{1}{2}x + 3$ $-\frac{1}{2}$		$5x - 3y = 6$ $3y = 5x - 6$ $y = \frac{5}{3}x - 2$ $\frac{5}{3}$
$x - 10 = -15$ undefined		$y + 7 = 9$ zero

finding slope

Parallel lines have the SAME slope.

Find the slope of a line parallel to line ℓ .

$-\frac{1}{4}$
 $// = -\frac{1}{4}$

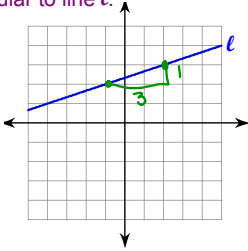


parallel

Perpendicular lines have slopes that are OPPOSITE RECIPROCAL.

Find the slope of a line perpendicular to line ℓ .

$\frac{1}{3}$ $\perp = -3$



perpendicular

Find the slope of the line that passes through the given points. Then state whether the lines are parallel, perpendicular, or neither.

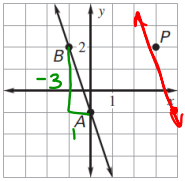
line 1: $(-1, 4)$ and $(19, 14)$ $\frac{1}{2}$ Neither
 line 2: $(7, -10)$ and $(13, 2)$ $\frac{1}{2}$ //

line 1: $(9, 0)$ and $(1, 16)$ -2 //
 line 2: $(-2, 5)$ and $(-3, 7)$ -2 //

line 1: $(-3, 5)$ and $(6, 5)$ 0
 line 2: $(1, -2)$ and $(1, -9)$ undefined \perp

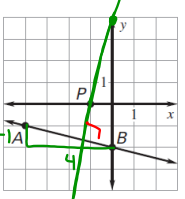
compare slopes

Graph the line parallel to line AB that passes through point P.



Graph the line perpendicular to line AB that passes through point P.

$-\frac{1}{4}$
 $\perp = -\frac{1}{4}$



Conclusion

- How do you find slope given 2 points?
 $\frac{y-y}{x-x}$
- What is true about parallel lines?
 Same Slope
- How do you know lines are perpendicular?
 Opposite Reciprocals
- Questions????

graphing lines

Sep 17-10:08 AM

Assignment

Parallel and Perpendicular Lines Wkst 1

Midpt. $(\frac{x+x}{2}, \frac{y+y}{2})$

① Find Midpt. $(4, -2)(12, 4)$
 $(\frac{16}{2}, \frac{2}{2}) = (8, 1)$

② Find Endpt. $E(-2, 3) M(4, -1)$ $(10, -5)$

$2 \cdot 4 = \frac{-2+x}{2} \cdot 2$ $2 \cdot -1 = \frac{3+y}{2} \cdot 2$

$8 = \frac{-2+x}{2} \cdot 2$ $-2 = \frac{3+y}{2} \cdot 2$

$\begin{array}{r} 8 = -2+x \\ +2 \quad +2 \\ \hline 10 = x \end{array}$ $\begin{array}{r} -2 = 3+y \\ -3 \quad -3 \\ \hline -5 = y \end{array}$

Sep 17-10:11 AM

Sep 21-8:57 AM