

6.2

Slopes of Parallel and Perpendicular Lines

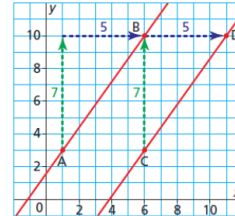
Lesson 3

Connect

NOTES:

Slopes of Parallel Lines

When two lines have the same slope, congruent triangles can be drawn to show the rise and the run.



STUDY:

Lines that have the same slope are parallel

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Connect

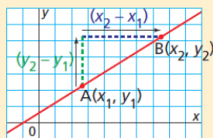
NOTES:

How to find the slope using 2 points on a line

Slope of a Line

A line passes through $A(x_1, y_1)$ and $B(x_2, y_2)$.

$$\text{Slope of line AB} = \frac{y_2 - y_1}{x_2 - x_1}$$



Practice

EXAMPLE 1

Line GH passes through $G(-4, 2)$ and $H(2, -1)$.

Line JK passes through $J(-1, 7)$ and $K(7, 3)$

Line MN passes through $M(-4, 5)$ and $N(5, 1)$

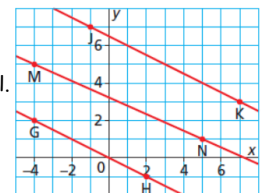
Graph has been provided.

Find the slope of each line to determine if the lines are parallel.

$$m_{GH} = \frac{2 - (-1)}{-4 - 2} = \frac{3}{-6} = -\frac{1}{2}$$

$$m_{JK} = \frac{7 - 3}{-1 - 7} = \frac{4}{-8} = -\frac{1}{2}$$

$$m_{MN} = \frac{5 - 1}{-4 - 5} = \frac{4}{-9}$$



parallel

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Practice **YOU TRY!**

Line EF passes through E(-3,-2) and F(-1, 6).
 Line CD passes through C(-1, -3) and D(1,7)
 Line AB passes through A(-3,7) and N(-5,-2)
 Graph has been provided.

Find the slope of each line to determine if the lines are parallel.

Slope = $\frac{y_2 - y_1}{x_2 - x_1}$

$$m_{EF} = \frac{-2-6}{-3-(-1)} = \frac{-8}{-2} = 4$$

$$m_{CD} = \frac{-3-7}{-1-1} = \frac{-10}{-2} = 5$$

$$m_{AB} = \frac{7-(-2)}{-3-(-5)} = \frac{9}{2}$$

No Parallel Lines.
No slopes are the same

Connect **NOTES:**

Slopes Perpendicular Lines

Slopes of Perpendicular Lines

The slopes of two oblique perpendicular lines are negative reciprocals; that is, a line with slope a , $a \neq 0$, is perpendicular to a line with slope $-\frac{1}{a}$.

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Practice **EXAMPLE 2**

Line PQ passes through P(-7,2) and Q(-2, 10)
 Line RS passes through R(-3,-4) and S(5, 1)

a) Are these two lines parallel, perpendicular, or neither?

$$m_{PQ} = \frac{2-10}{-7-(-2)} = \frac{-8}{-5} = \frac{8}{5}$$

$$m_{RS} = \frac{-4-1}{-3-5} = \frac{-5}{-8} = \frac{5}{8}$$

Reciprocal but not negative reciprocal

b) Draw the two lines on a graph to verify your answer.

↓
neither

Practice **YOU TRY!**

Line ST passes through S(-2,7) and T(2, -5)
 Line U passes through U(-2, 3) and V(7, 6)

a) Are these two lines parallel, perpendicular, or neither?

$$m_{ST} = \frac{7-(-5)}{-2-2} = \frac{12}{-4} = -3$$

$$m_{UV} = \frac{3-6}{-2-7} = \frac{-3}{-9} = \frac{1}{3}$$

negative reciprocal
∴ perpendicular

b) Draw the two lines on a graph to verify your answer.

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Practice

HOMEWORK!

Textbook Questions:

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Page 350 # 10, 16, 17

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