

Investigating Slopes

1. Calculate the slope using $\frac{\text{rise}}{\text{run}}$ of each line.

Line #1

$$m = \frac{0}{3} = 0$$

Line #2

$$m = \frac{0}{5} = 0$$

Line #3

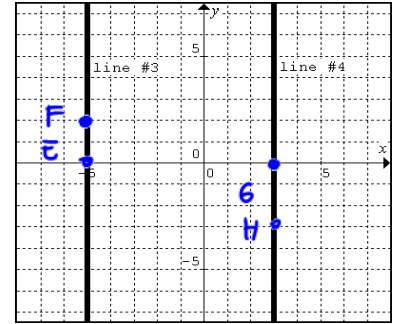
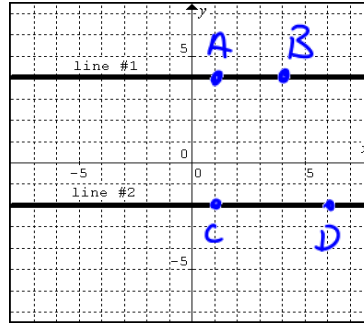
$$m = \frac{2}{0}$$

= undefined

Line #4

$$m = \frac{3}{0}$$

= undefined



What can you conclude about the slope of horizontal lines?

Their slopes equal 0

What can you conclude about the slope of vertical lines?

Their slopes are undefined

2. The following two lines are **PARALLEL**.

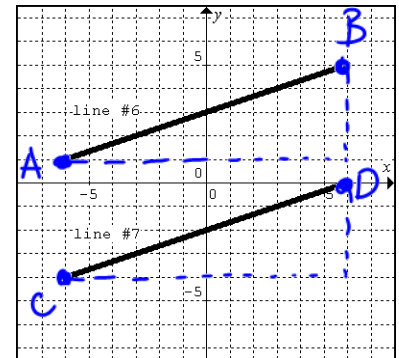
Calculate the slope of each line using $\frac{\text{rise}}{\text{run}}$.

Line #6

$$m_{AB} = \frac{4}{12} = \frac{1}{3}$$

Line #7

$$m_{CD} = \frac{4}{12} = \frac{1}{3}$$



What can you conclude about the slopes of parallel lines?

Parallel lines have the same slope.

line #6 || line #7 $\overline{AB} \parallel \overline{CD}$ (read: line segment AB is parallel to line segment CD) parallel.

3. The following graphs have lines that are **PERPENDICULAR**. The relationship is a more difficult to see, so we are completing two examples.

★ Calculate the slope of each line using $\frac{\text{rise}}{\text{run}}$.

Line #8

$$m_8 = \frac{2}{1} = 2$$

Line #9

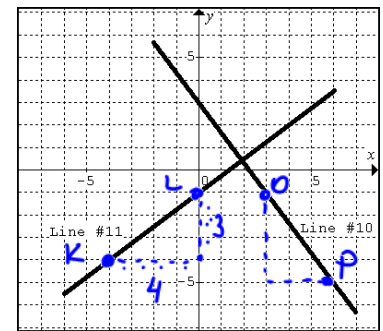
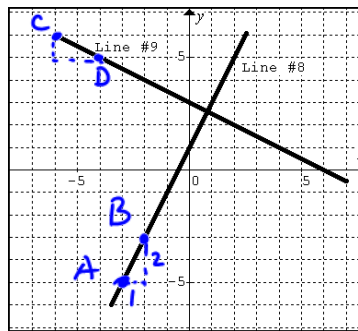
$$m_9 = \frac{-1}{2} = -\frac{1}{2}$$

Line #10

$$m_{10} = \frac{-4}{3}$$

Line #11

$$m_{11} = \frac{3}{4}$$



What type of relationship do you see between slope 8 & 9 and slope 10 & 11?

m_9 is negative reciprocal of m_8

line #10 \perp line #11

m_{10} is negative reciprocal of m_{11}

perpendicular

Lines that are perpendicular have negative reciprocal slopes.

When you multiply slopes of perpendicular lines together, the result is always -1.

$$m_8 \times m_9 = 2 \times \frac{-1}{2} = -1 \quad \text{OR} \quad m_{10} \times m_{11} = \frac{3}{4} \times \frac{-4}{3} = \boxed{-1}$$