

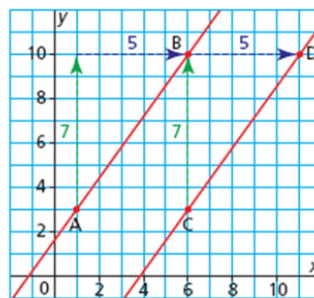
Lesson 8-Parallel lines and perpendicular lines

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

Lines that have the same slope are parallel.

$$\text{Slope of AB} = \frac{7}{5}$$

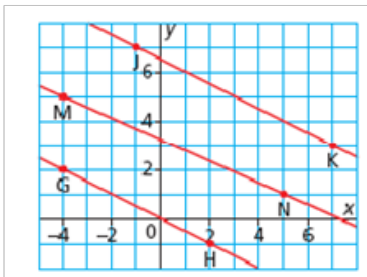
$$\text{Slope of CD} = \frac{7}{5}$$



Same slope
 \therefore parallel

Therefore slopes AB and CD are parallel because they have the same slope

2. 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). Are they parallel? Justify the answer

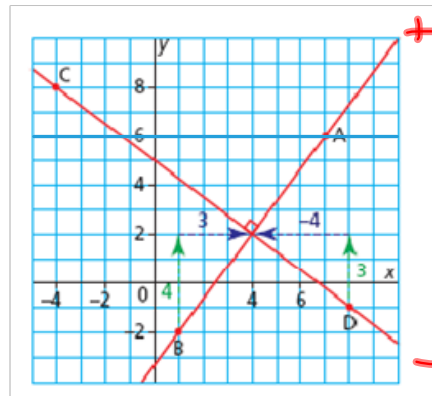


Do they have the same slope?

\therefore . . .

3. Non-parallel lines in the same plane have different slopes. Perpendicular lines are not parallel, so they have different slopes.

Lines AB and CD are drawn perpendicular.
 Slope of AB = $\frac{\text{rise}}{\text{run}}$ Slope of CD = $\frac{\text{rise}}{\text{run}}$
 Slope of AB = $\frac{4}{3}$ Slope of CD = $\frac{3}{-4}$
 Slope of CD = $-\frac{3}{4}$



Perpendicular

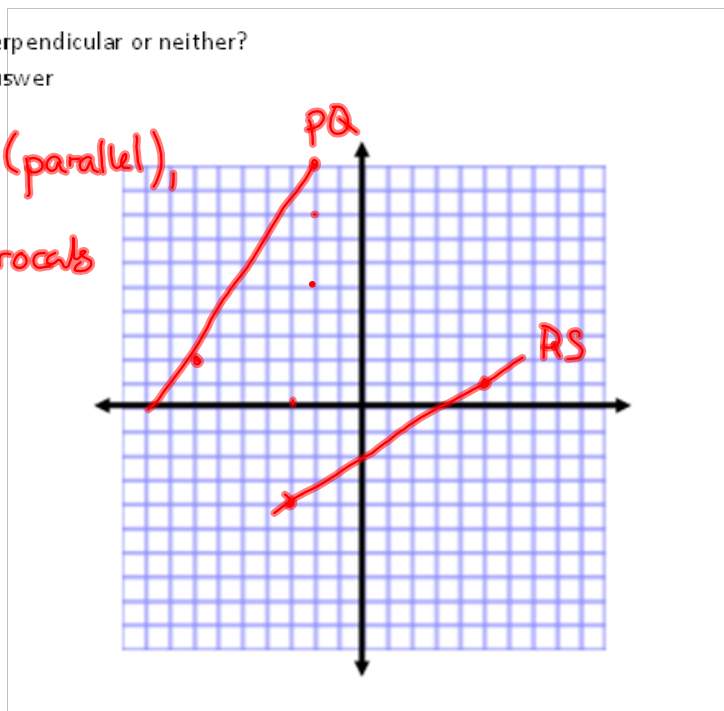
$-\frac{3}{4}$ is the negative reciprocal of $\frac{4}{3}$.
 Flip Fraction

Therefore Perpendicular lines have slopes that are negative reciprocals

4. 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?
- b) Sketch the lines to verify the answer

Are slopes the same (parallel),
 are the slopes negative-reciprocals
 (perpendicular), neither?

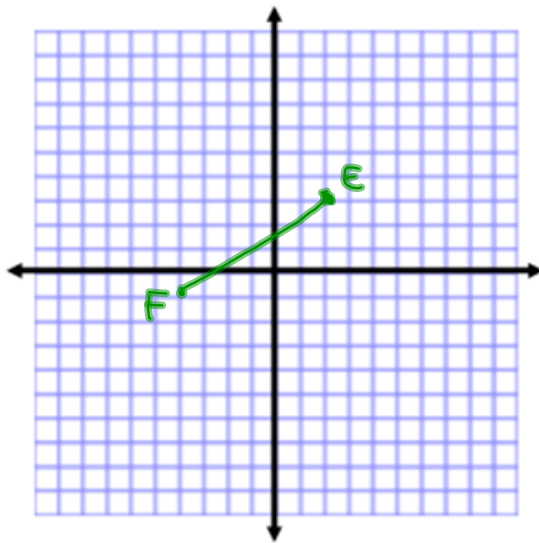


5a. Determine the slope of a line that is perpendicular to the line through E(2,3) and F(-4,-1)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 3}{-4 - 2} = \frac{-4}{-6} = \frac{4}{6}$$

Perpendicular: -reciprocal
 $-\frac{6}{4}$

b) Determine the coordinates of G so that line EG is perpendicular to line EF. Draw line EF



$$E = (2, 3)$$

$x_2 \quad y_2$

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

$$\frac{-6}{4} = \frac{3 - y_1}{2 - x_1} = \frac{3 - 9}{2 - (-2)} = \frac{-6}{4} \checkmark$$

$$(-2, 9)$$

