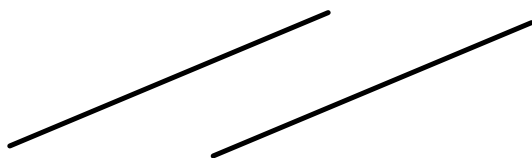


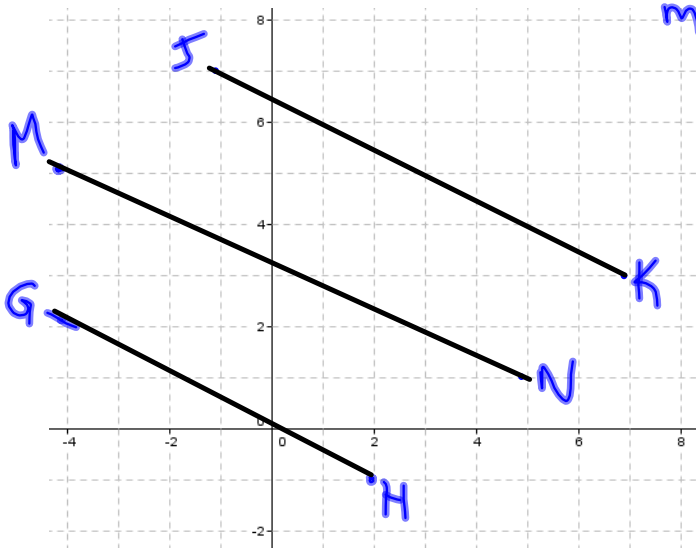
Section 6.2: Slope of Parallel and Perpendicular Lines

Parallel Lines: Two lines that will never intersect.
Have the Same Slope



Example: Determine which of the following lines are parallel.

- 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)



$$m = \text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

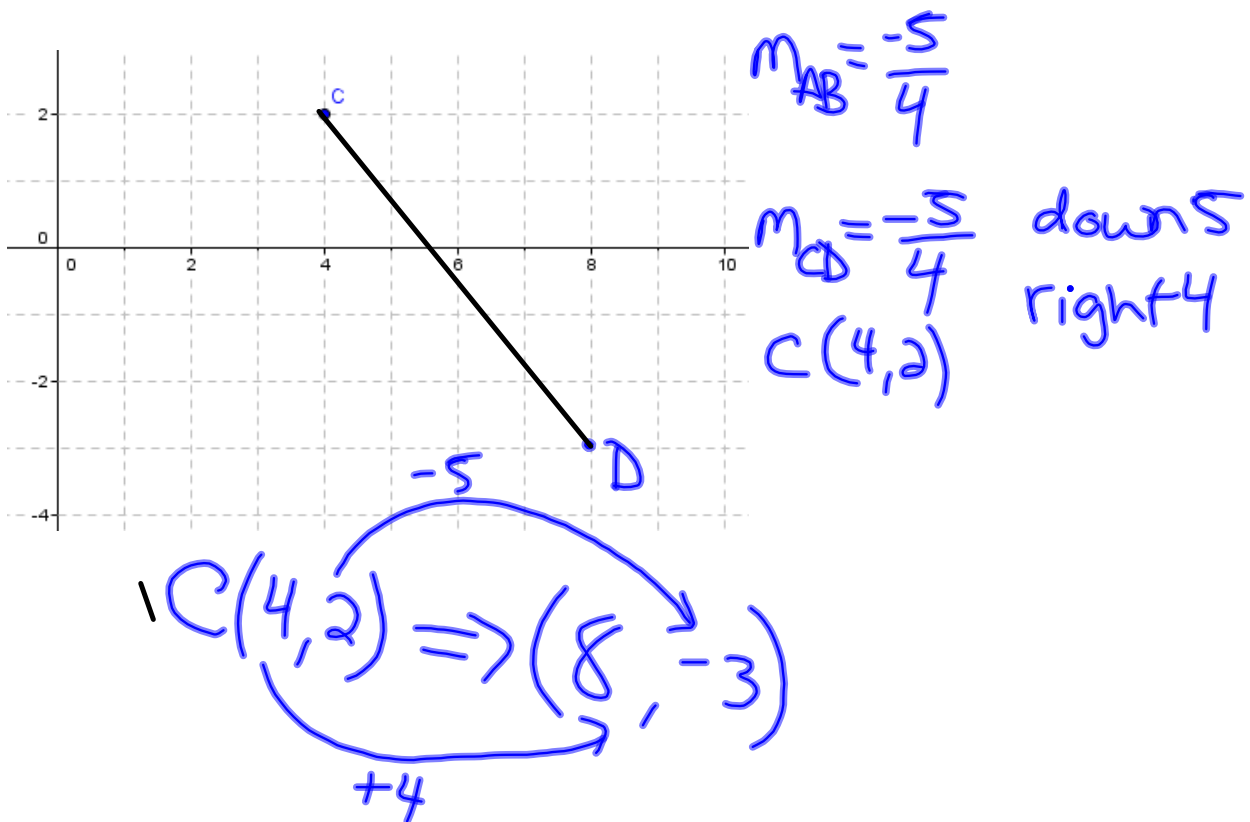
$$m_{GH} = \frac{-1 - 2}{2 - (-4)} = \frac{-3}{6} = -\frac{1}{2}$$

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

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

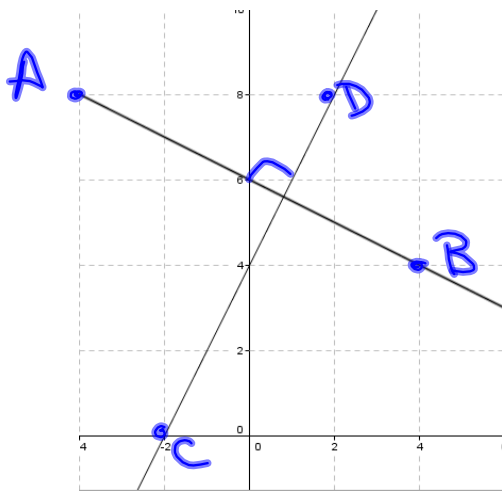
Lines GH and JK are parallel

Example: Line AB has a slope of $-\frac{5}{4}$. Line CD is parallel to line AB. If the coordinates of point C are $(4,2)$ find point D.



Perpendicular Lines:

- Intersect at a 90 degree angle
- The slope of perpendicular lines are negative reciprocals



$$m = \frac{3}{4} \quad m = -\frac{4}{3}$$

$$A(-4, 8) \quad B(4, 4)$$

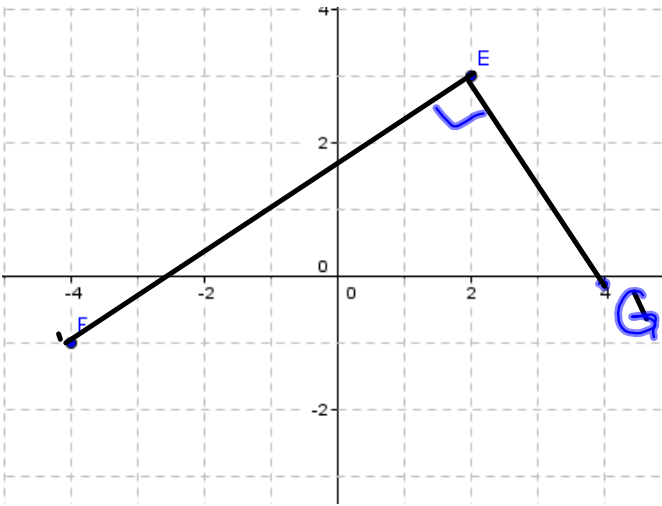
$$m_{AB} = \frac{4-8}{4-(-4)} = \frac{-4}{8} = -\frac{1}{2}$$

$$C(-2, 0) \quad D(2, 8)$$

$$m_{CD} = \frac{8-0}{2-(-2)} = \frac{8}{4} = 2$$

Example:

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



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

Slope of a perpendicular line is $= \underline{\underline{-\frac{3}{2}}}$

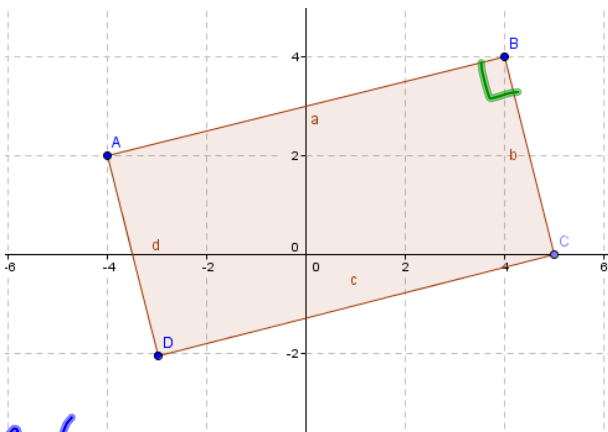
Determine the coordinates of G so that a line EG is perpendicular to EF

$$E(2,3) \Rightarrow (4,0) \text{ Point G}$$

+2

Example: Using Slope to identify a Polygon.

ABCD is a parallelogram. Is it a rectangle?



Parallelogram

→ opposite sides are
Parallel.

Rectangle.

- Sides are perpendicular

$$A(-4, 2) \quad B(4, 4)$$

$$m_{AB} = \frac{4-2}{4-(-4)} = \frac{2}{8} = \frac{1}{4}$$

$$B(4, 4) \quad C(5, 0)$$

$$m_{BC} = \frac{0-4}{5-4} = \frac{-4}{1}$$

It is a Rectangle Since the sides
are perpendicular.

Homework:

Page 349 #'s 5, 6, 8, 9, 11, 13