Warm Up

Find the slope of each line:

1. Contains $L(4,3)$ and $M(2,9)$

$\frac{9-3}{2-4} = \frac{6}{-2} = -3$

subtr. y's on top
subtr. x's in same order on bottom

2. $y = 5x - 2$

3. $x - 3y = 6$

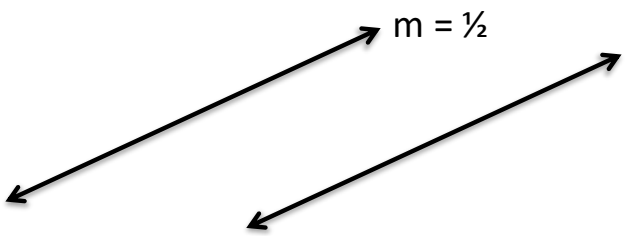
$-x \quad -x$

$\frac{-3y}{-3} = \frac{-x}{-3} + \frac{6}{-3} \rightarrow y = \frac{1}{3}x - 2$

4. Are any of the lines parallel? Why? no, none of slopes are equal

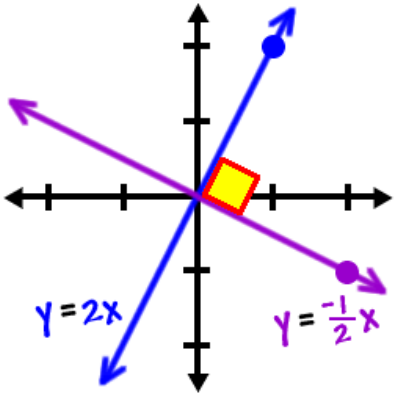
5. Are any of the lines perpendicular? Why? yes, -3 and $\frac{1}{3}$ are opp. recip.

10.2 Slope and Perpendicular Lines

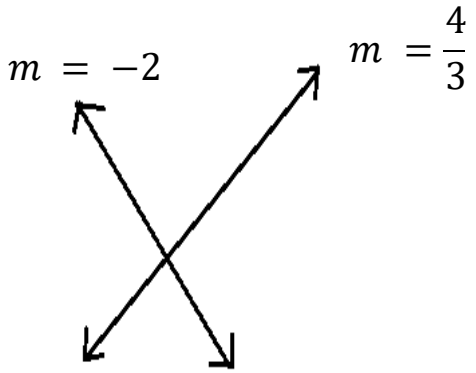


Parallel = Same slope

Perpendicular = Opposite Reciprocal Slopes



Intersecting = no relationship with slopes



Using Slope to Determine the Shape:

Check if it's a Parallelogram:

- Find slopes of sides and check if opposite sides are parallel (same slope).

→if no, then either trapezoid (1 pair parallel) or nothing special (no parallel)

→if yes, now check for rectangle and rhombus

Using Slope to Determine the Shape:

Check if it's a Rectangle:

- See if consecutive sides are perpendicular (slopes are opposite reciprocals)

Check if it's a Rhombus:

- Find slopes of diagonals and check if they are perpendicular (opposite reciprocals)

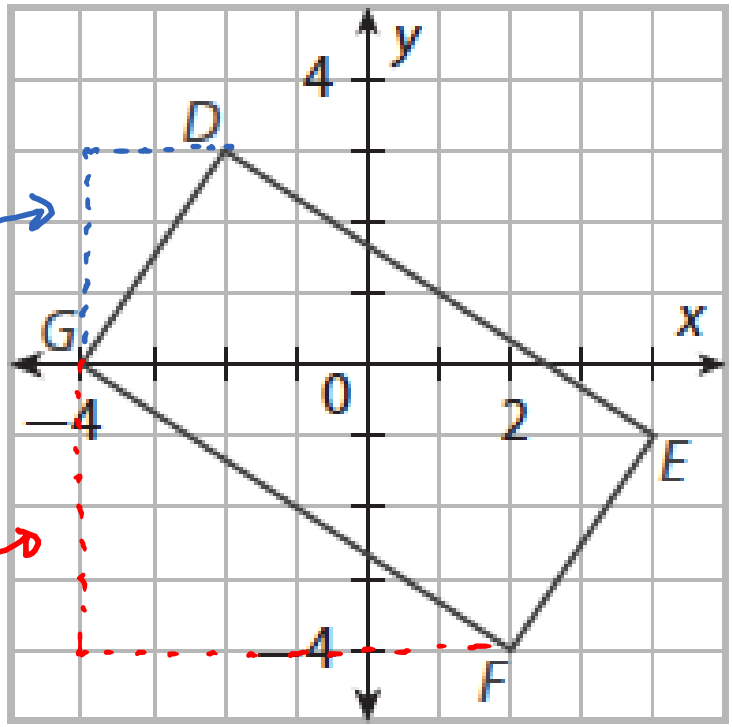
If the sides AND diagonals are perpendicular, then it is a SQUARE!

Ex. Show that $DEFG$ is a rectangle.

slope = $\frac{\text{rise}}{\text{run}}$

go left to right

$\frac{3}{2}$ and $-\frac{2}{3}$ are opp. recip.; so sides are perp.



Ex. A city block is a quadrilateral bounded by four streets with given equations. Classify the quadrilateral bounded by the streets.

Street	Equation
Pine Street	$-x+2y=4$
Elm Road	$2x+y=7$
Chestnut Street	$2y=x-6$
Cedar Road	$y+8=-2x$

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

$2x+y=7$
$-2x \quad -2x$
$y=-2x+7$

$\frac{2y}{2}=\frac{x}{2}-\frac{6}{2}$
$y=\frac{1}{2}x-3$

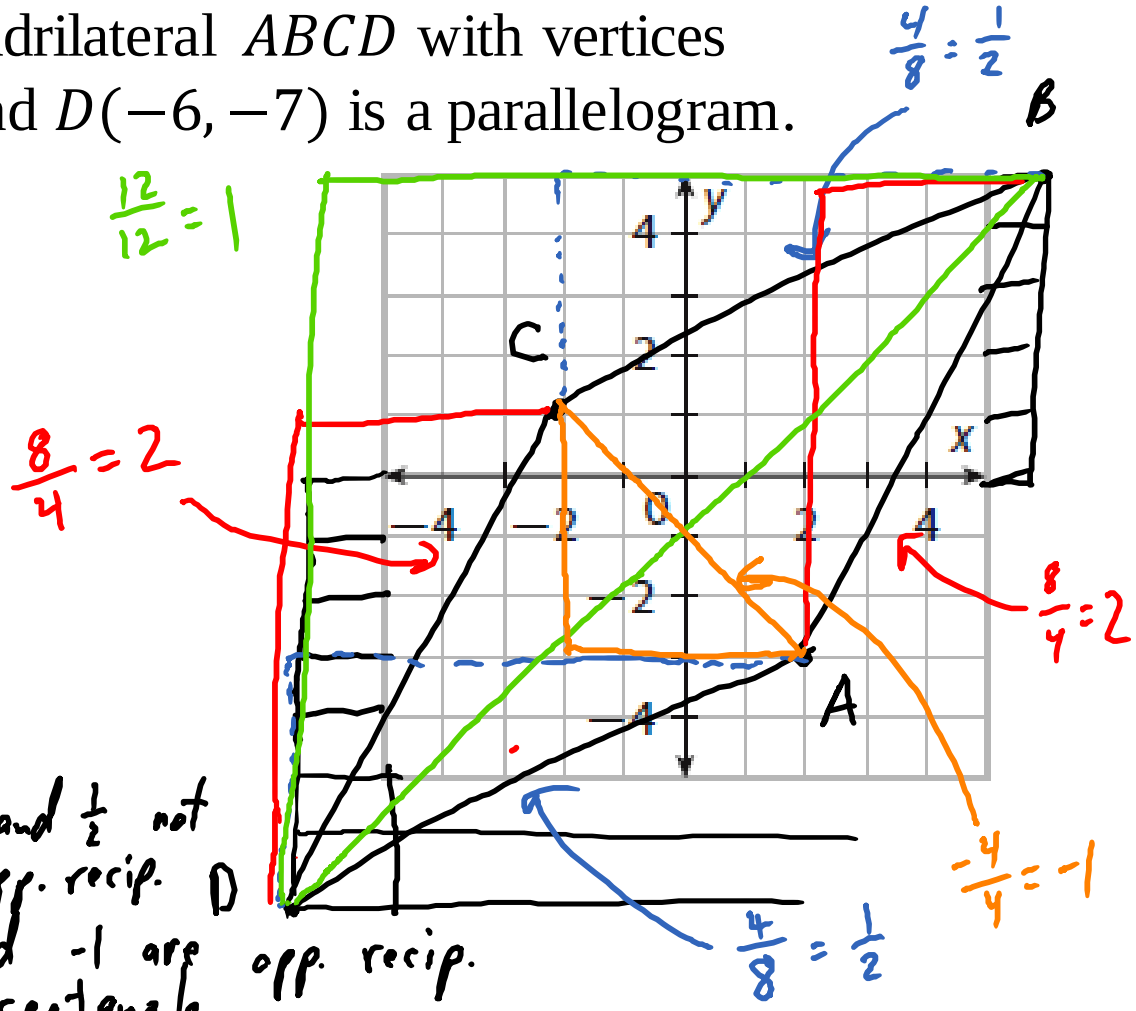
$y+8=-2x$
$-8 \quad -8$
$y=-2x-8$

sides have same slope
$\Rightarrow$ parallelogram
-2 and $\frac{1}{2}$ are opp. recip.
$\Rightarrow$ rectangle

Ex. Write the equation of the line perpendicular to $y = 4x - 9$ that passes through the point $(2,10)$.

Ex. Determine whether the quadrilateral $ABCD$ with vertices $A(2,-3)$, $B(6,5)$, $C(-2,1)$, and $D(-6,-7)$ is a parallelogram.

yes, opp. slopes are equal



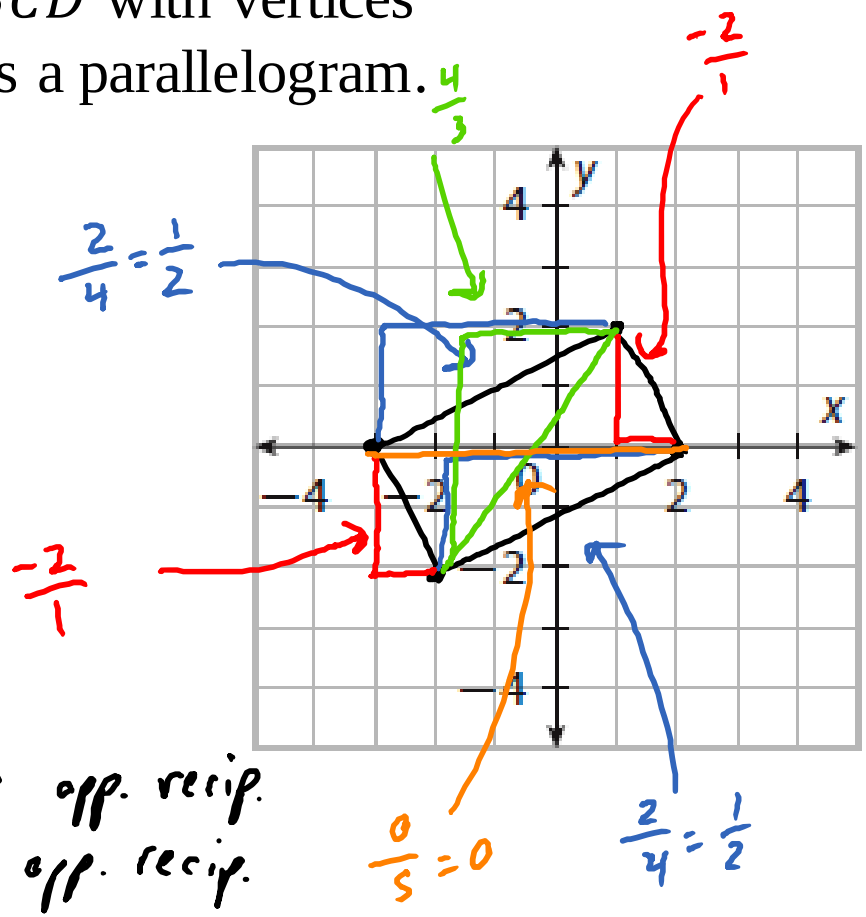
Is it a rectangle? Why? No, 2 and $\frac{1}{2}$ not opp. recip.

Is it a rhombus? Why? Yes, 1 and -1 are opp. recip.

Is it a square? Why? No, not rectangle

Ex. Determine whether the quadrilateral $ABCD$ with vertices $A(-3,0)$, $B(1,2)$, $C(2,0)$, and $D(-2,-2)$ is a parallelogram.

yes, opp. side have same slope



Is it a rectangle? Why? yes, $\frac{1}{2}$ and $-\frac{2}{1}$ are opp. recip.

Is it a rhombus? Why? no, $\frac{4}{3}$ and 0 are not opp. recip.

Is it a square? Why? no, not rhombus

City Map Project Rough Draft is due Thursday

By the end of next class, you will turn in:

- Score Sheet/Legend (Page 3 of assignment sheet)
  - All item names will be listed in the legend
- Calculations Sheet (Page 4 of assignment sheet)
  - Work should be clearly labeled on a separate sheet
  - Score is based on accuracy of your answers
  - I'm happy to check your answers
- Draft Map (Page 5 of assignment sheet)
  - All items labeled and numbered as in legend
  - Do not color
  - Must include all 26 items from the list on Page 2

DON'T START FINAL DRAFT UNTIL THE ROUGH DRAFT IS RETURNED