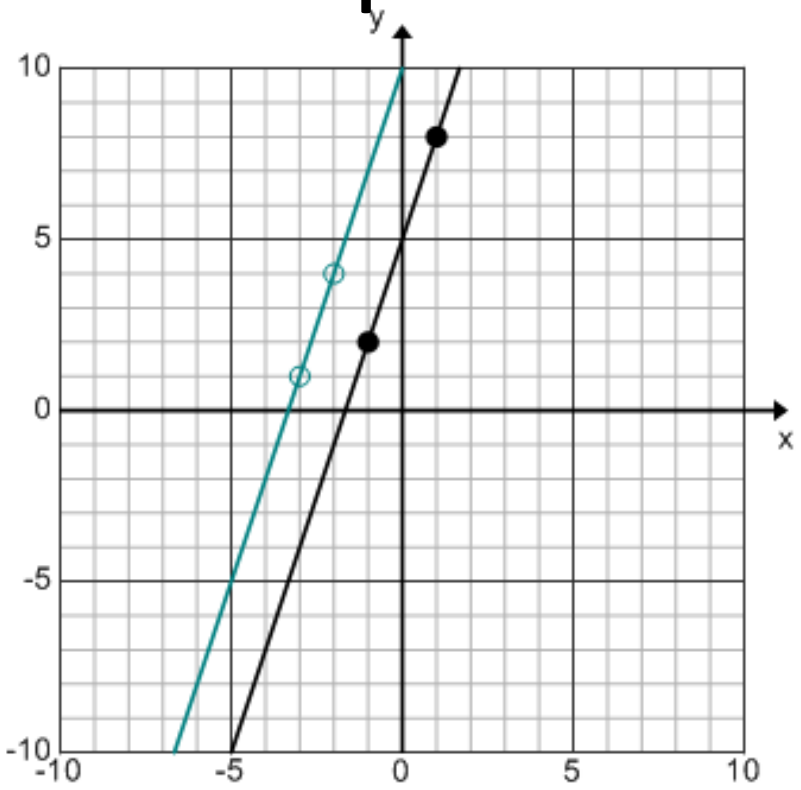
Warm Up

1. Write the equation of the line that goes through the points (-1,2) and (1,8) using any form you like.

2. Write the equation of the line that goes through the points (-3,1) and (-2,4) the same form you did in #1

3. Graph the lines of both equations.

Warm Up Answers



Form	Points (-1,2) and (1,8)	Points (-3,1) and (-2,4)
Slope-Intercept Form	y=3x+5	y=3x+10
Point-Slope Form	y-2=3(x+1) or y-8=3(x-1)	y-1=3(x+3) or y-4=3(x+2)
Standard Form	3x-y=-5	3x-y=10

Parallel and Perpendicular Lines

Identifying and writing equations of parallel and perpendicular lines

Essential Questions

- Can we identify special relationships between pairs of linear equations?
- If so, what exactly is it that makes these relationships special i.e. what identifies them as special?

Objectives

- We will observe and predict the way in which the graphs of linear equations interact.
- We will make generalizations about how groups of lines with certain traits will behave.
- We will write linear equations using our generalizations.

Warm Up (cont.)

- Was there anything worth noting about the two linear equations from the warm up?
  - What are the similarities?
  - What are the differences?
  - Which form of linear equation is best for noting these similarities and differences?

Warm Up (cont.)

Do you think our observations from the warm up can be applied generally?

Line Activity

- Line Activity in GeoGebra
  - Making observations and predictions about how lines interact
- Debrief
  - What did we find?
  - Generalizing our findings if possible

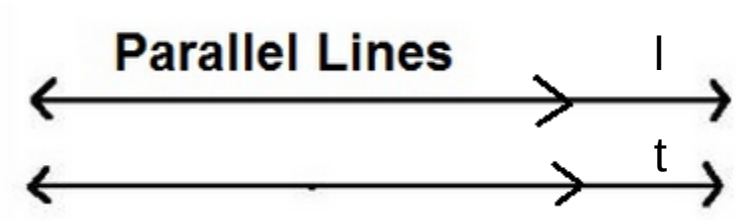
Parallel and Perpendicular Lines

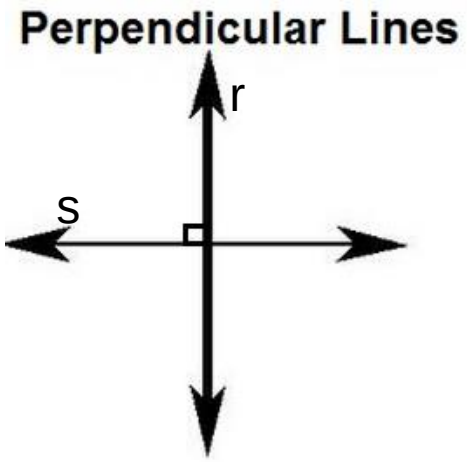
- Lines that are parallel will have the same rate of change/slope.
- Lines that are perpendicular will intersect at a 90 degree angle.
- There are special notations we use to indicate each.

Examples

	Parallel	**Perpendicular**
Writing	$\parallel$	$\perp$
	Example	*Example*
	Line l is $\parallel$ to line t	Line s is $\perp$ to line r

On images/graphs





Linear Equations of Parallel and Perpendicular Lines

- Parallel lines have the same slope
  - Ex. $y = 5x + 1$ and $y = 5x - 7$ are parallel
- Perpendicular lines have *opposite* **and** *reciprocal* slopes
  - Ex. $y = \frac{1}{4}x + 3$ and $y = -4x - 5$ are perpendicular

- Note: when analyzing graphs to determine if your lines are parallel or perpendicular, you must find the actual slope– looks can be deceiving!

Writing equations for parallel and perpendicular lines

What if you needed to find the equation of a line that was parallel or perpendicular to a line given and goes through a certain point?

Writing equations for parallel and perpendicular lines

- Write the equation of a line that is parallel to $y = 2x + 8$ and contains the point (2,3)

- Write the equation of a line that is perpendicular to $y = -\frac{2}{3}x + 9$ and contains the point (6,1)