10/21/19 - Warm Up Problem

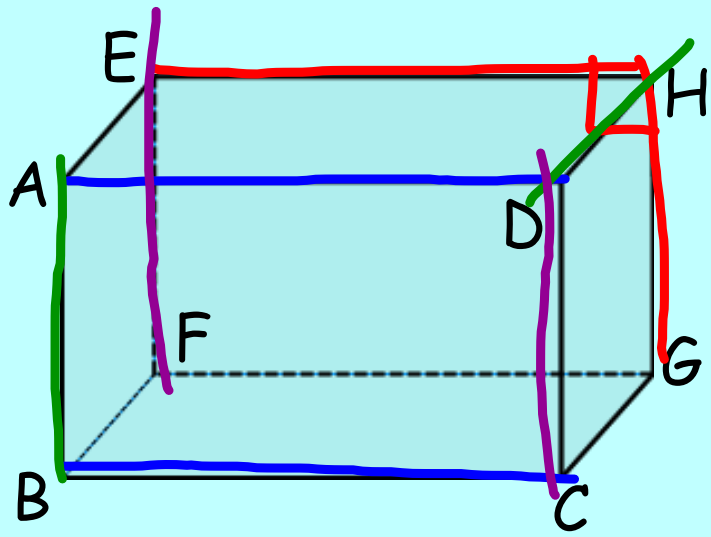
Classify each pair of lines as either parallel, perpendicular, or skew.

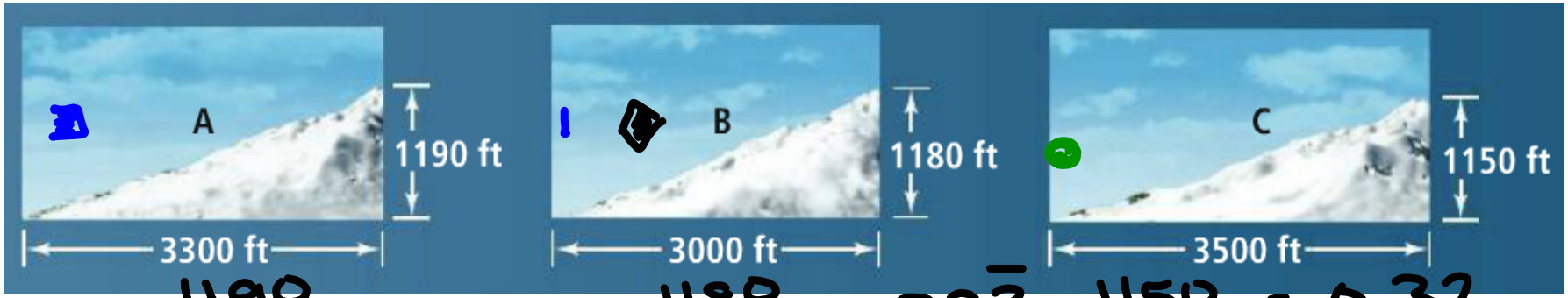
1. $\overleftrightarrow{BC}$ and $\overleftrightarrow{AD}$ parallel

2. $\overleftrightarrow{HG}$ and $\overleftrightarrow{EH}$ perpen.

3. $\overleftrightarrow{AB}$ and $\overleftrightarrow{DH}$ skew

4. $\overleftrightarrow{EF}$ and $\overleftrightarrow{DC}$ parallel





$\frac{1190}{3300} = 0.36$ $\frac{1180}{3000} = .393$ $\frac{1150}{3500} = 0.32$

Ski resorts use steepness to help rate the difficulty of their hills. Which hill should get each rating?

Section 3.7 - Equations of Lines in the Coordinate Plane

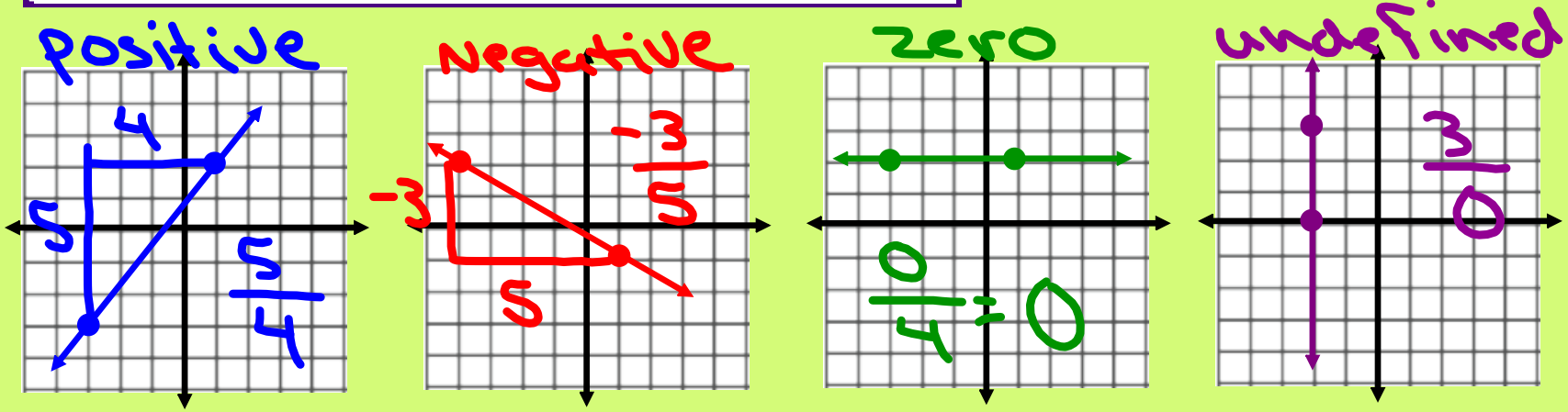
Goals:

- Calculate slopes of lines when given two points
- Determine if lines are parallel or perpendicular based on slope

Slope in the Coordinate Plane

- Negative slope lines go downhill
- Positive slope lines go uphill
- Zero slope lines are horizontal
- Undefined slope lines are vertical

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



Calculating Slopes of Lines

Find the slope of the line through each pair of points.

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

$x_1 y_1$ $x_2 y_2$

1. (-4,0) and (6,-4)

$$m = \frac{-4-0}{6--4} = \frac{-4}{10} = \frac{-2}{5}$$ ↘

$x_1 y_1$ $x_2 y_2$

2. (1,4) and (1,-2)

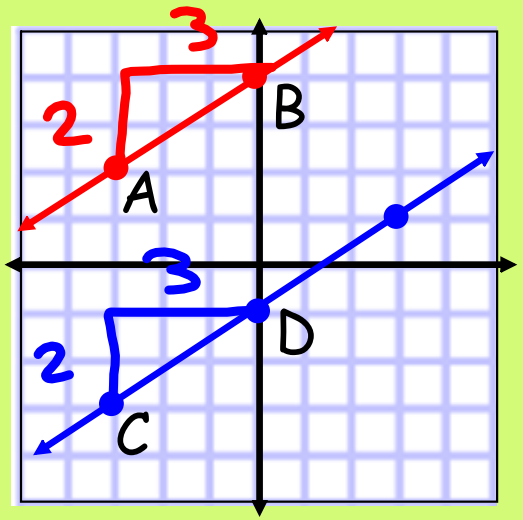
$$m = \frac{-2-4}{1-1} = \frac{-6}{0} = \text{undefined}$$ ↕

$x_1 y_1$ $x_2 y_2$

3. (4,2) and (-3,2)

$$m = \frac{2-2}{-3-4} = \frac{0}{-7} = 0$$ ↔

Line AB and Line CD are parallel.



slope of $\overleftrightarrow{AB}$ = $\frac{2}{3}$

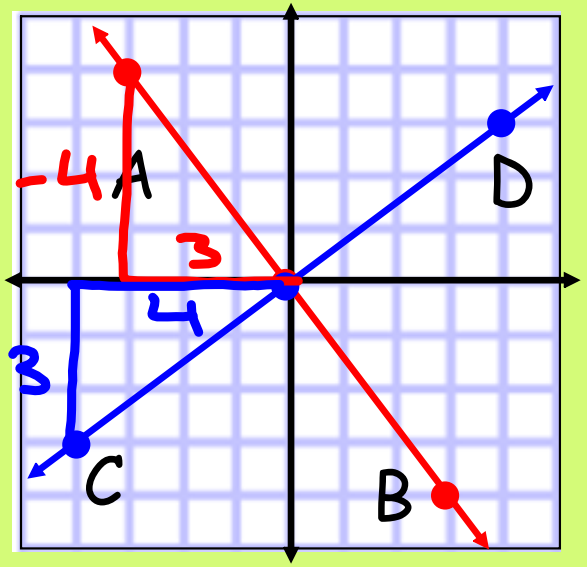
slope of $\overleftrightarrow{CD}$ = $\frac{2}{3}$

Slopes of Parallel Lines

Two nonvertical lines are parallel if and only if they have the same slope.

Any two vertical lines are parallel.

Line AB and Line CD are perpendicular.



slope of $\overleftrightarrow{AB}$ = $-\frac{4}{3}$

slope of $\overleftrightarrow{CD}$ = $\frac{3}{4}$

Slopes of Perpendicular Lines

Two nonvertical lines are perpendicular if and only if they have opposite, reciprocal slopes.

Any horizontal and vertical line are perpendicular.

EXAMPLE 1: Are line AB and line CD parallel, perpendicular, or neither?

$x_1 y_1$ $x_2 y_2$
A(-8, 3) B(-4, 11)
x_1 y_1 x_2 y_2
C(-1, 3) D(1, 2)

$m_1 = \frac{11-3}{-4--8} = \frac{8}{4} = \frac{2}{1}$

$m_2 = \frac{2-3}{1--1} = \frac{-1}{2}$

They are Perpendicular

Do this example in your notes

Use the slope formula to find the slope of each line.

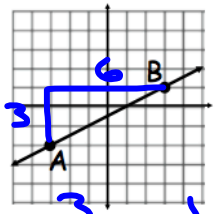
Assignment:

Concept 8 Worksheet - due by Friday 10/25
(#1-7)

CALCULATING SLOPE

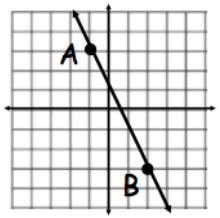
Use the graph to find the slope of line AB. Write the slope as a fraction in simplest form.

1.

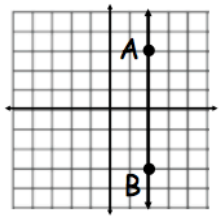


$m: \frac{3}{6} = \frac{1}{2}$

2.



3.



Find the slope of line 1 and line 2 below. Determine if the lines are parallel, perpendicular, or neither. Show your work for calculating the slope.

4. Line 1: (1,0) and (7,4) $x_1 y_1$ $x_2 y_2$
Line 2: (7,0) and (3,6)

$m_1 = \frac{4-0}{7-1} = \frac{4}{6} = \frac{2}{3}$

$m_2 = \frac{6-0}{3-7} = \frac{6}{-4} = -\frac{3}{2}$

These lines are perpendicular

5. Line 1: (-3,1) and (-7, -2)
Line 2: (2, -1) and (8, 4)

$m_1 =$

$m_2 =$

These lines are _____

6. Line 1: (-9, 3) and (-5, 7)
Line 2: (-11, 6) and (-7, 2)

$m_1 =$

$m_2 =$

These lines are _____

7. Line 1: (-3, 4) and (1, 2)
Line 2: (6, 2) and (8, 1)

$m_1 =$

$m_2 =$

These lines are _____