

### Exploration: Similar Triangles on a Line

1. a. Pick two points on line A.

b. Draw a right triangle so that the distance between the two points you chose is the hypotenuse.

c. Write the ratio of the length of the vertical leg of your right triangle to the length of the horizontal leg.

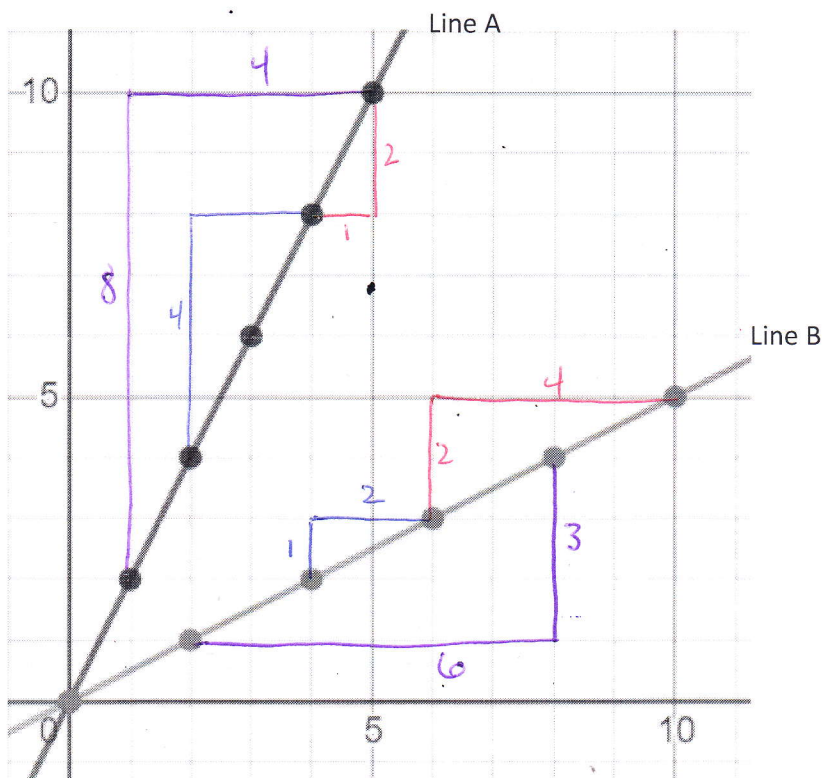
$$\frac{\text{vertical}}{\text{horizontal}} = \frac{4}{2} = \frac{2}{1}$$

d. Repeat this process two more times with different points (try to get different sized triangles). **What do you notice?**

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{2}{1}$$

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{8}{4} = \frac{2}{1}$$

*All three ratios simplify to the same thing  $\frac{2}{1}$  or 2*



2. a. Pick two points on line ~~A~~ **B**.

b. Draw a right triangle so that the distance between the two points you chose is the hypotenuse.

c. Write the ratio of the length of the vertical leg of your right triangle to the length of the horizontal leg.

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{1}{2}$$

d. Repeat this process two more times with different points (try to get different sized triangles). **What do you notice?**

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{3}{6} = \frac{1}{2}$$

*All three ratios simplify to the same thing  $\frac{1}{2}$*

3. Which line is steeper, Line A or Line B? How does this relate to the ratio's you found?

*Line A is steeper and its ratio is larger  $2 > \frac{1}{2}$*

4. a. Pick two points on line C.

b. Draw a right triangle so that the distance between the two points you chose is the hypotenuse.

c. Write the ratio of the length of the vertical leg of your right triangle to the length of the horizontal leg.

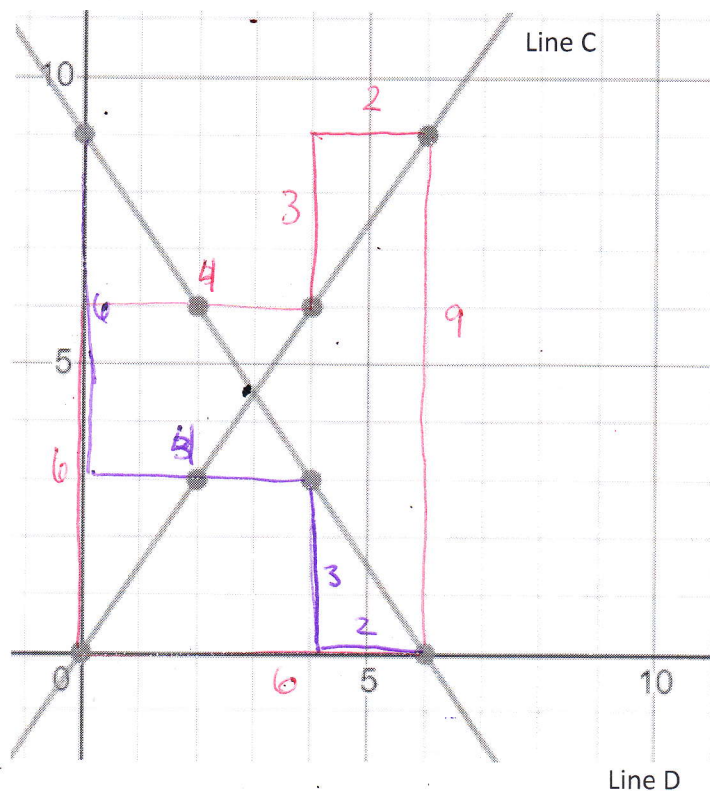
$$\frac{\text{vertical}}{\text{horizontal}} = \frac{3}{2}$$

d. Repeat this process two more times with different points (try to get different sized triangles). What do you notice?

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{6}{4} = \frac{3}{2}$$

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{9}{6} = \frac{3}{2}$$

ALL RATIOS  
SIMPLIFY  
TO  $\frac{3}{2}$



5. a. Pick two points on line D.

b. Draw a right triangle so that the distance between the two points you chose is the hypotenuse.

c. Write the ratio of the length of the vertical leg of your right triangle to the length of the horizontal leg.

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{3}{2}$$

d. Repeat this process two more times with different points (try to get different sized triangles). What do you notice?

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{6}{4} = \frac{3}{2}$$

$$\frac{\text{vertical}}{\text{horizontal}} = \frac{9}{6} = \frac{3}{2}$$

ALL RATIOS SIMPLIFY TO  $\frac{3}{2}$

6. Which line is steeper, Line C or Line D? How does this relate to the ratio's you found?

They seem to have the same steepness, just different directions

They are both  $\frac{3}{2}$

7. How do you think we can indicate that the direction of Lines C and D are different?

⊕ uphill  $\frac{3}{2}$   
⊖ downhill  $-\frac{3}{2}$