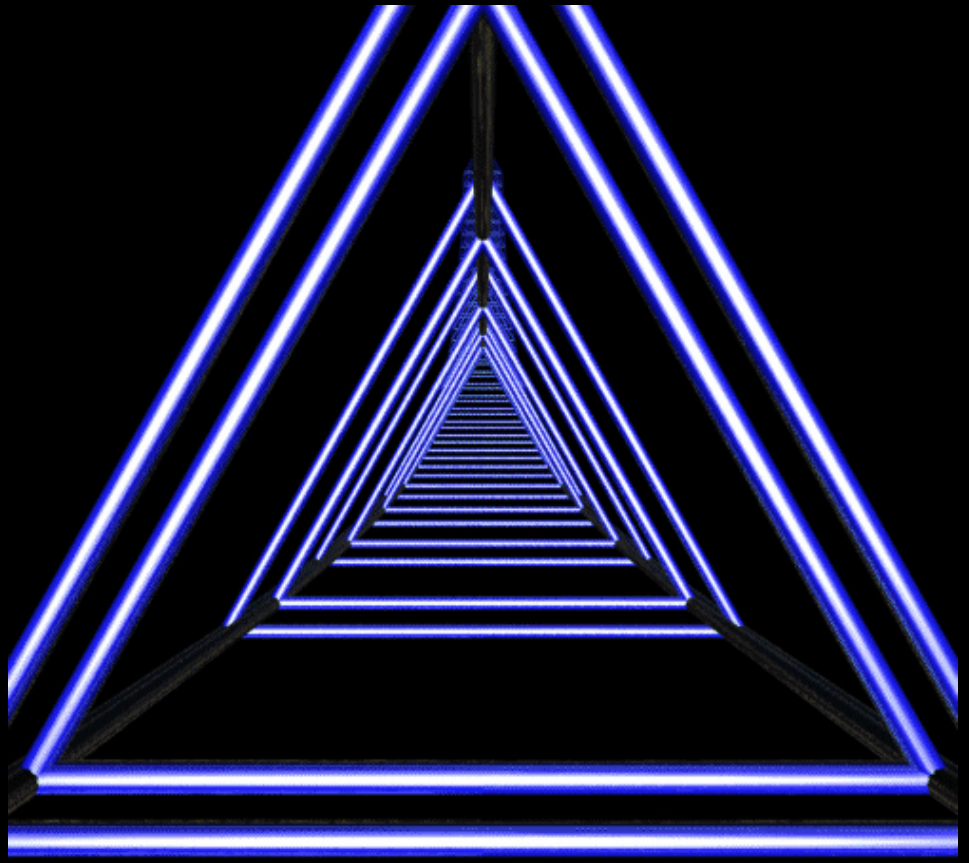
Side Length Quotients in Similar Triangles

Lesson 9

Building on	**7.RP.A.2** Recognize and represent proportional relationships between quantities.
Addressing	**8.G.A** Understand congruence and similarity using physical models, transparencies, or geometry software. **8.G.A.4** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

Let’s find missing side lengths in triangles!



Two-three-four and Four-five-six

Warm Up 9.1

Triangle *A* has side lengths 2, 3, and 4.

Triangle *B* has side lengths 4, 5, and 6.

Is triangle *A* similar to Triangle *B*?

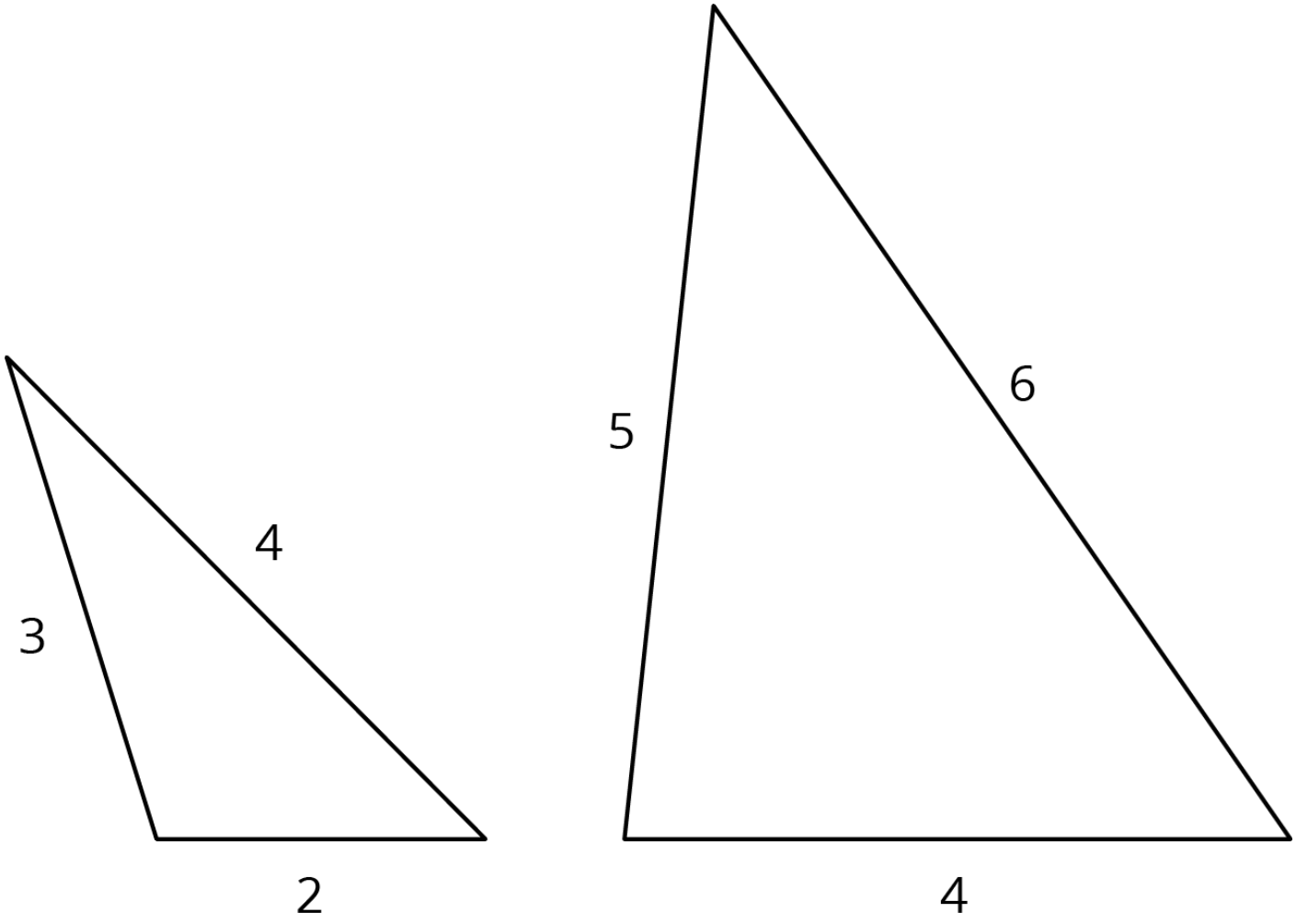
Begin with Quiet Work Time. (2 min)

Triangle *A* has side lengths 2, 3, and 4.

Triangle *B* has side lengths 4, 5, and 6.

Is triangle *A* similar to Triangle *B*?

How can you decide if the triangles are similar without drawing a diagram?


4
3
2
6
5
4

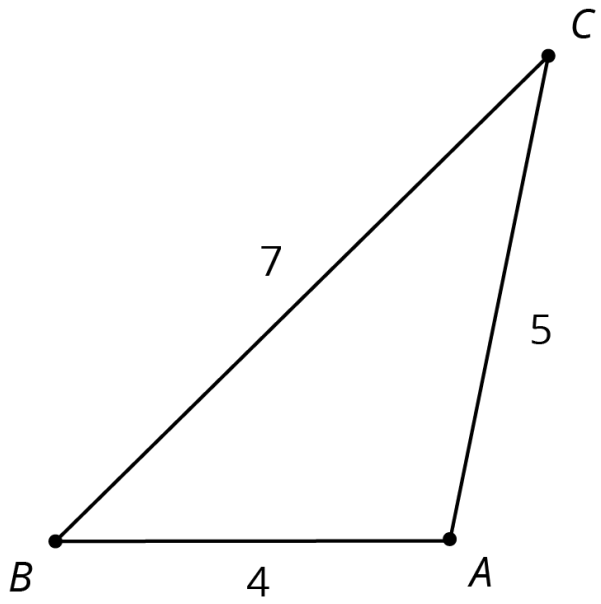
Quotients of Sides Within Similar Triangles

Activity 9.2

- Discussion Supports

Each teammate will work on a column in the second table. Then we'll compare findings.

triangle	(long side) ÷ (short side)	(long side) ÷ (medium side)	(medium side) ÷ (short side)
ABC	$\frac{7}{4}$ or 1.75		
DEF			
GHI			
JKL			



Begin with Quiet Work Time. (5 min)

Let's collaborate!

triangle	scale factor	length of short side	length of medium side	length of long side
ABC	1	4	5	7
DEF	2	8	10	14
GHI	3	12	15	21
JKL	$\frac{1}{2}$	2	2.5	3.5

What is the value of (medium side) ÷ (long side)?

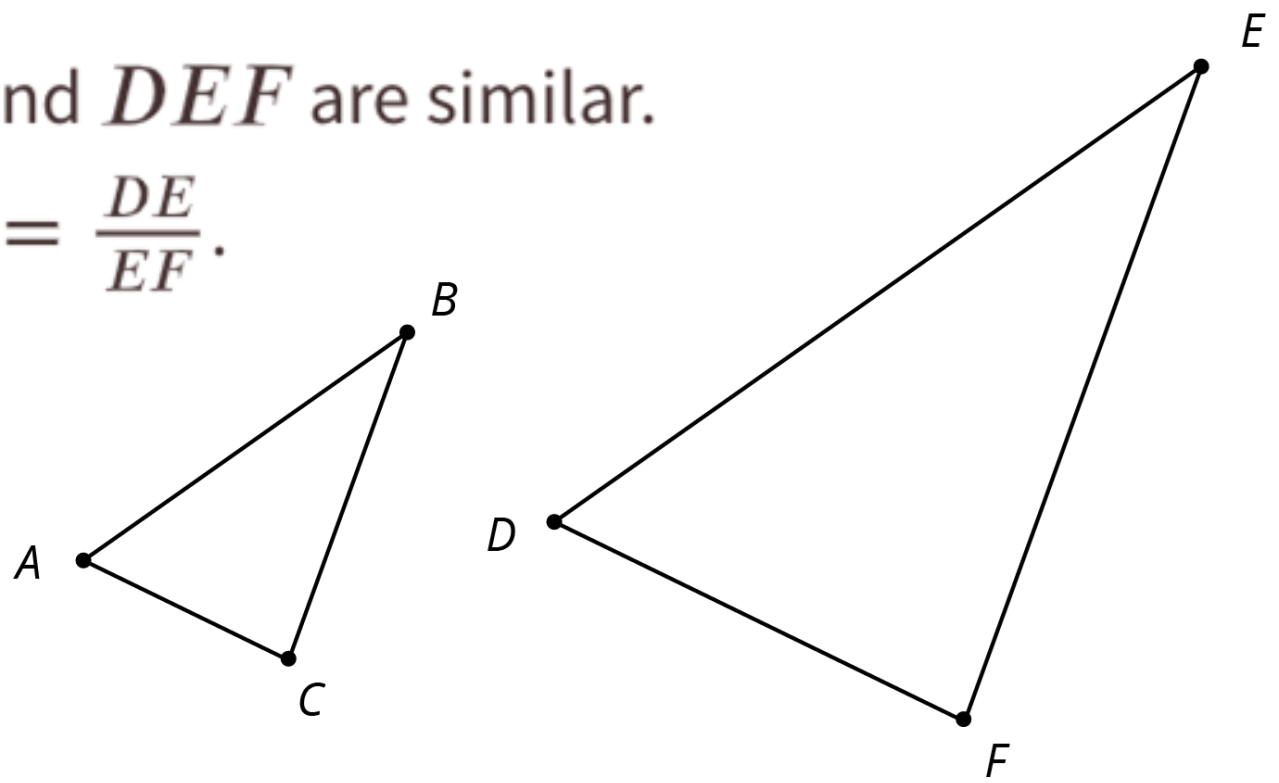
Would that value be the same for all similar triangles to triangle *ABC*? Why or why not?

triangle	(long side) ÷ (short side)	(long side) ÷ (medium side)	(medium side) ÷ (short side)
ABC	$\frac{7}{4}$ or 1.75	$\frac{7}{5}$ or 1.4	$\frac{5}{4}$ or 1.25
DEF	$\frac{14}{8}$ or 1.75	$\frac{14}{10}$ or 1.4	$\frac{10}{8}$ or 1.25
GHI	$\frac{21}{12}$ or 1.75	$\frac{21}{15}$ or 1.4	$\frac{15}{12}$ or 1.25
JKL	$\frac{3.5}{2}$ or 1.75	$\frac{3.5}{2.5}$ or 1.4	$\frac{2.5}{2}$ or 1.25

Are you ready for more?

Triangles ABC and DEF are similar.

Explain why $\frac{AB}{BC} = \frac{DE}{EF}$.



Using Side Quotients to Find Scale Lengths of Similar Triangles

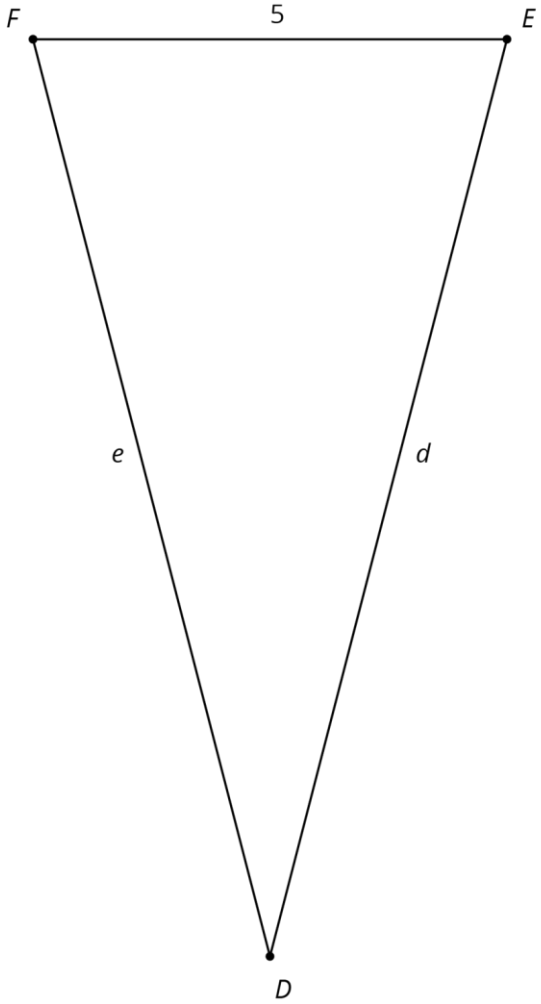
Activity 9.3

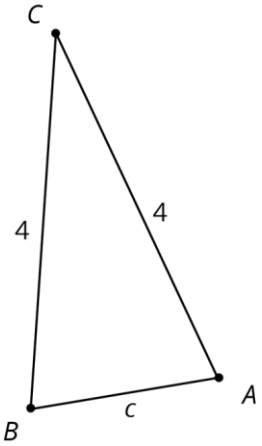
- 5 Practices
- Discussion Supports

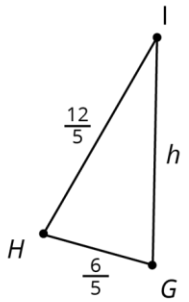
There are many ways to find the values of the unknown side lengths in similar triangles.

Use what you've learned so far!

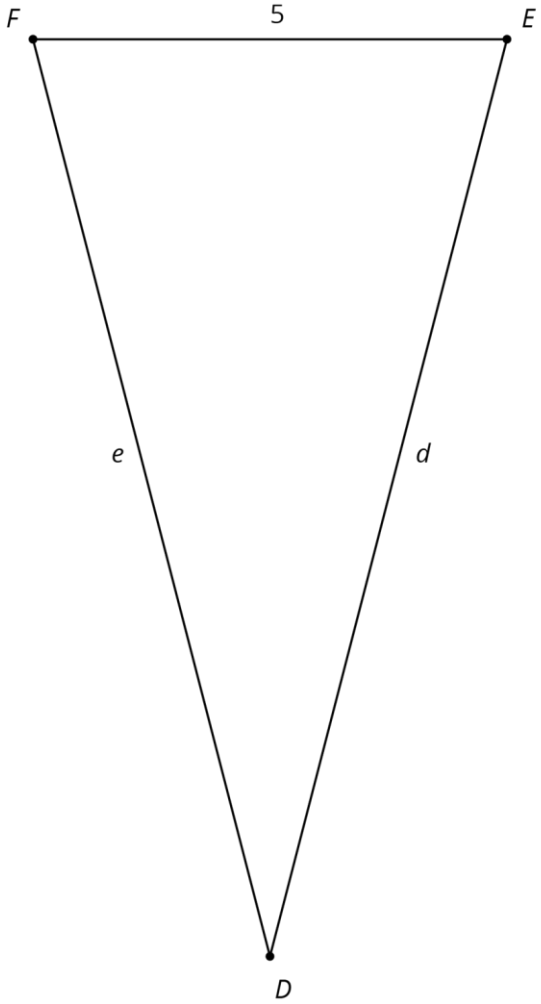
Begin with Quiet Work Time. (5 min)

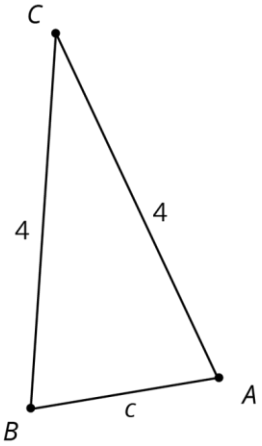


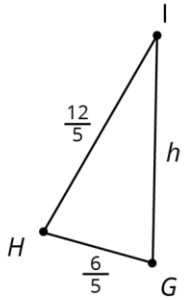




How did you find the unknown side lengths?



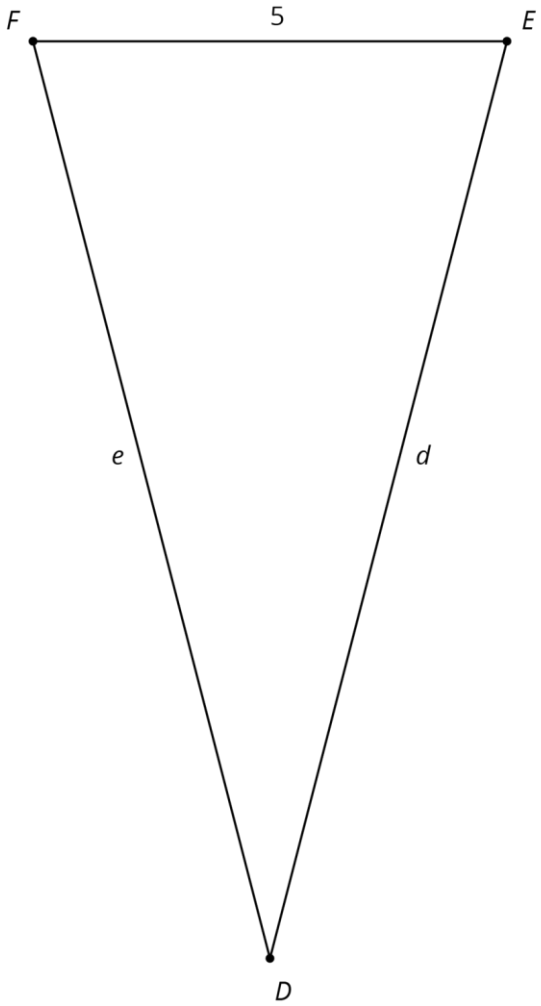


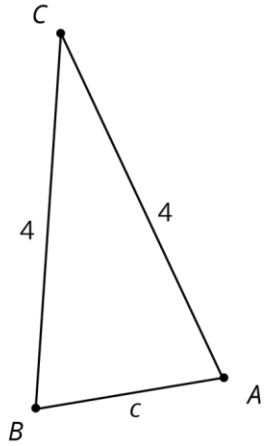


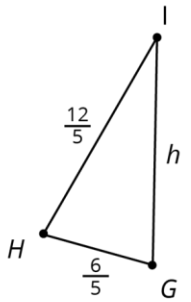
BIG IDEAS:

Triangle *ABC* has 2 equal side lengths, so the other two triangles will as well!

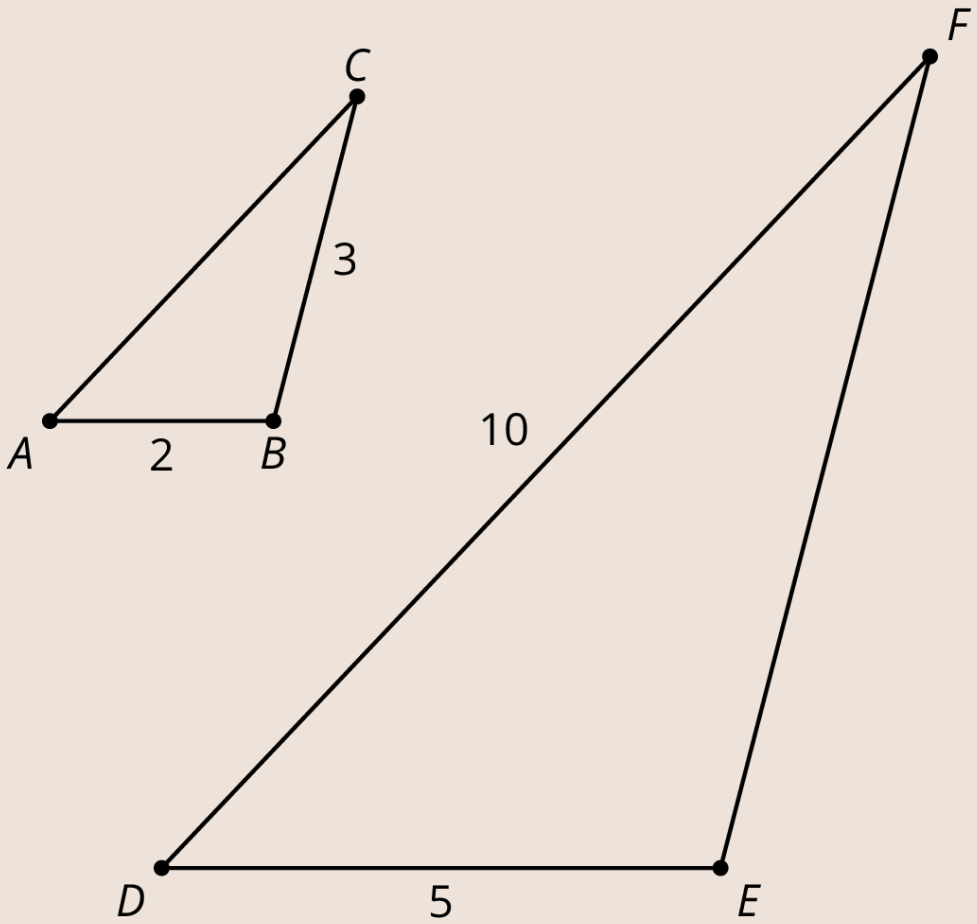
One side of triangle *GHI* is twice the length of another side, so this is true of the other triangles as well.







What is the scale factor from triangle *ABC* to triangle *DEF*?



Today's Goals

- I can decide if two triangles are similar by looking at quotients of lengths of corresponding sides.
- I can find missing side lengths in a pair of similar triangles using quotients of side lengths.

Similar Sides

Cool Down 9.4