Scale Factors and Making Scaled Copies

Let's draw scaled copies.

2.1 Math Talk: Multiplying by a Unit Fraction

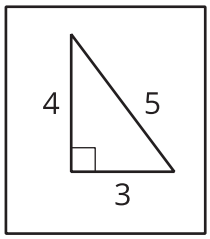
Find the value of each expression mentally.

- $\frac{1}{4} \cdot 20$
- $44 \cdot \frac{1}{4}$
- $\frac{1}{3} \cdot 63$
- $90 \cdot \frac{1}{6}$

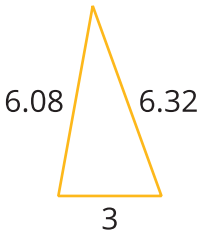
2.2 Scaled Triangles

Here is Triangle O, followed by a number of other triangles.

O



A



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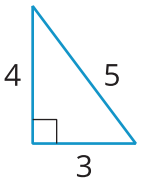

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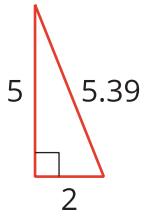

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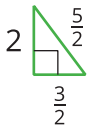

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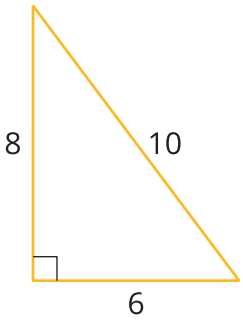

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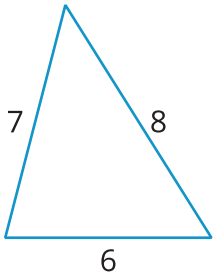

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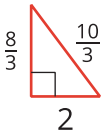

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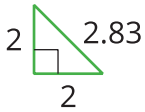

Your teacher will assign you two of the triangles to look at.

1. For each of your assigned triangles, is it a scaled copy of Triangle O? Be prepared to explain your reasoning.
2. As a group, identify *all* the scaled copies of Triangle O in the collection. Discuss your thinking. If you disagree, work to reach an agreement.
3. List all the triangles that are scaled copies in the table. Record the side lengths that correspond to the side lengths of Triangle O listed in each column.

Triangle O	3	4	5

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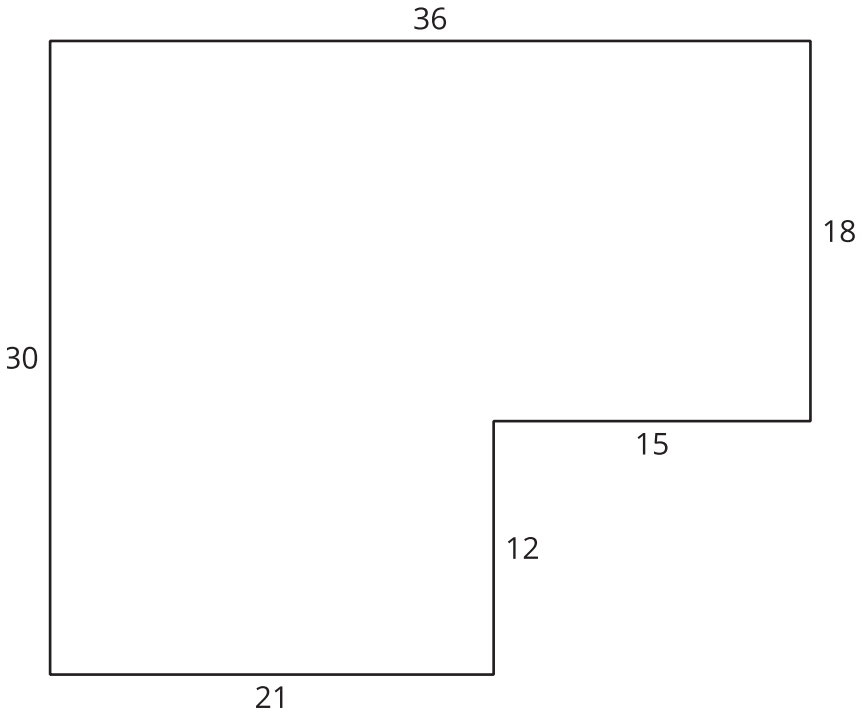
4. Explain or show how each copy has been scaled from the original (Triangle O).

Are you ready for more?

Choose one of the triangles that is not a scaled copy of Triangle O. Describe how you could change at least one side to make a scaled copy, while leaving at least one side unchanged.

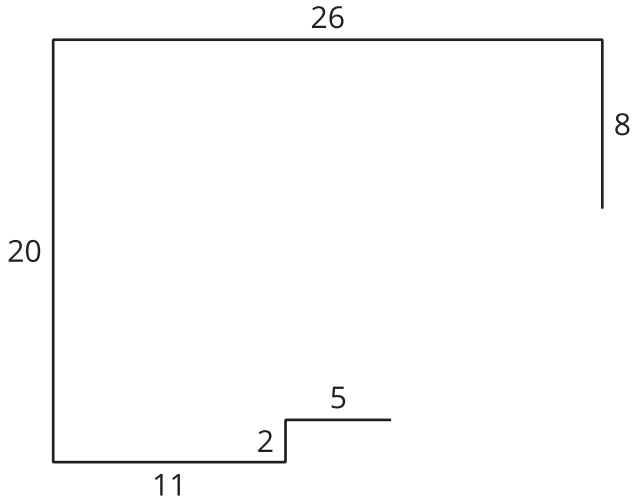
2.3 Which Operations?

Diego and Jada want to scale this polygon so the side that corresponds to 15 units in the original is 5 units in the scaled copy.

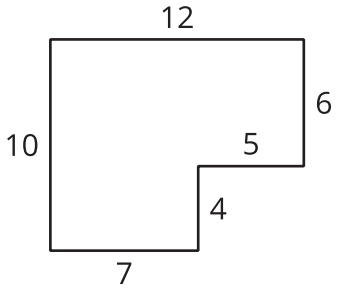


Diego and Jada each use a different operation to find the new side lengths. Here are their finished drawings.

Diego's drawing



Jada's drawing



1. What operation do you think Diego used to calculate the lengths for his drawing?

2. What operation do you think Jada used to calculate the lengths for her drawing?

3. Did each method produce a scaled copy of the polygon? Explain your reasoning.

Pause here for a whole-class discussion.

4. Andre wants to make a scaled copy of Jada's drawing so that the side that corresponds to 4 units in Jada's polygon is 8 units in his scaled copy. Create the scaled copy that Andre wants. If you get stuck, consider using the edge of an index card or paper to measure the lengths needed to draw the copy.

Are you ready for more?

The side lengths of Triangle B are all 5 more than the side lengths of Triangle A. Can Triangle B be a scaled copy of Triangle A? Explain your reasoning.

Lesson 2 Summary

Creating a scaled copy involves *multiplying* the lengths in the original figure by a **scale factor**.

For example, to make a scaled copy of triangle ABC where the base is 8 units, we would use a scale factor of 4. This means multiplying all the side lengths by 4, so in triangle DEF, each side is 4 times as long as the corresponding side in triangle ABC.