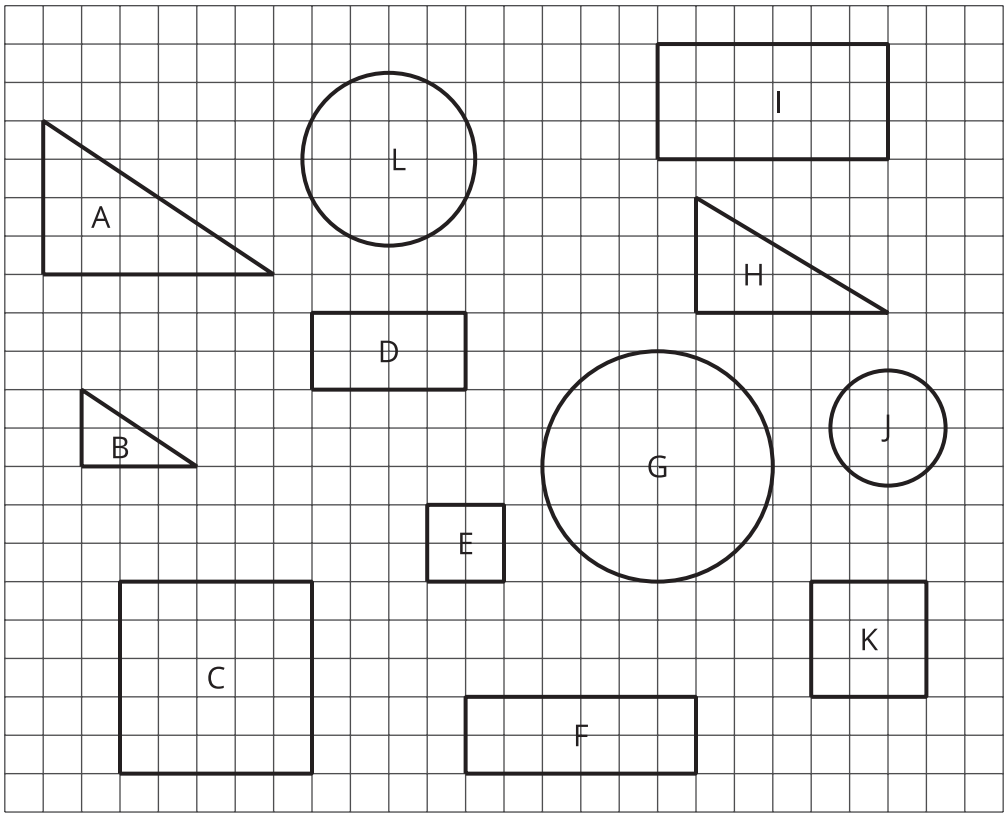
Unit 4, Lesson 1

Lots of Flags

Let's explore the U.S. flag.

1.1 Scaled or Not?

1. Which of the geometric objects are scaled versions of each other?



2. Pick two of the objects that are scaled copies, and find the scale factor.

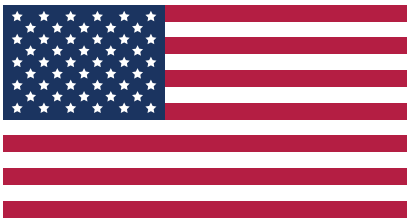
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1.2 Flags Are Many Sizes

One standard size for the United States flag is 19 feet by 10 feet. On a flag of this size, the union (the blue rectangle in the top-left corner) is about $7\frac{5}{8}$ feet by $5\frac{3}{8}$ feet.

There are many places that display flags of different sizes.

- Many classrooms display a U.S. flag.
- Flags are often displayed on stamps.
- There was a flag on the space shuttle.
- Astronauts on the Apollo missions had a flag on a shoulder patch.



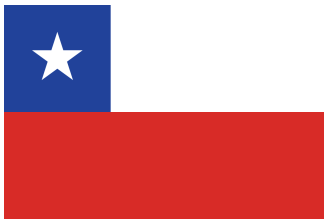
1. Choose one of the four options, or invent another example of your own. Decide on a size that would be appropriate for this flag. Then, find the size of the union.

2. Share your answer with another group that used a different option. What do your dimensions have in common?

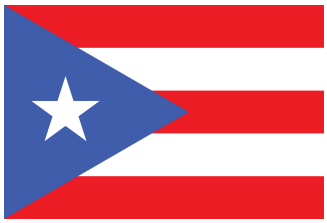
1.3 What Percentage Is Each Color?

Here are some flags that use the colors red, white, and blue.

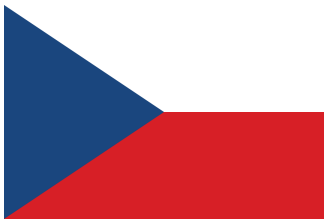
Chile



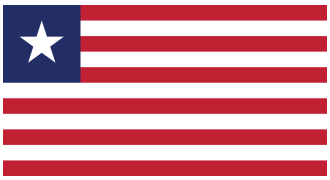
Puerto Rico



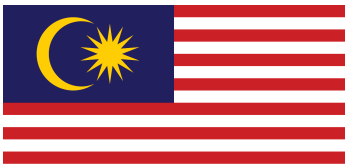
Czech Republic



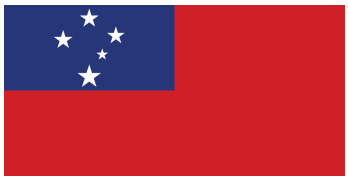
Liberia



Malaysia



Samoa



1. Take turns with your partner to match each flag with a description. The description gives the percentage of the flag's area that is each color.
   - For each match that you find, explain to your partner how you know it's a match.
   - For each match that your partner finds, listen carefully to their explanation. If you disagree, discuss your thinking, and work to reach an agreement.

   a. 36% red, 33% white, 24% blue

   b. 37% red, 37% white, 26% blue

   c. 46% red, 27% white, 27% blue

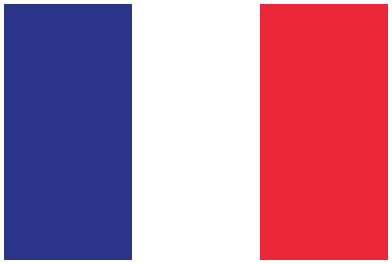
   d. 48% red, 42% white, 10% blue

   e. 50% red, 35% white, 15% blue

   f. 75% red, 1% white, 24% blue

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2. Here is an image of the flag of France. The three color bands are each the same width.



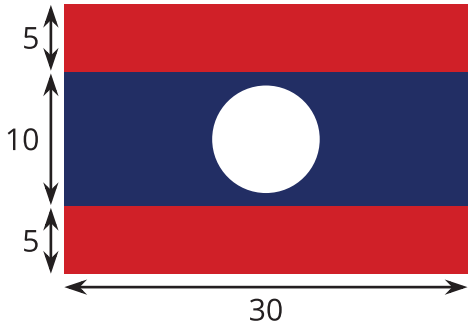
What percentage of this flag is:

a. red?

b. white?

c. blue?

3. Here is an image of the flag of Laos. The white circle has a diameter of 8 units.



What percentage of this flag is red?

1.4 What Percentage Is the Union?

On a U.S. flag that is 19 feet by 10 feet, the union is about $7\frac{5}{8}$ feet by $5\frac{3}{8}$ feet. For each question, first estimate the answer, then compute the actual percentage.

1. What percentage of the flag is taken up by the union?

2. What percentage of the flag is red? Be prepared to share your reasoning.

Are you ready for more?

The largest U.S. flag in the world is 225 feet by 505 feet.

1. Is the ratio of the length to the width equivalent to $1 : 1.9$, the ratio for official government flags?

2. If a square yard of the flag weighs about 3.8 ounces, how much does the entire flag weigh in pounds?

Lesson 1 Summary

Imagine you have a painting that is 15 feet wide and 5 feet high. To sketch a scaled copy of the painting, the ratio of the width and height of a scaled copy must be equivalent to $15 : 5$. What is the height of the scaled copy that has a width of 2 feet?

width	height
15	5
2	h

We know that the height is $\frac{1}{3}$ of the width, so $h = \frac{1}{3} \cdot 2$, or $\frac{2}{3}$.

Sometimes ratios include fractions and decimals. We will be working with these kinds of ratios in the next few lessons.

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