Cayuga Heights 5th Grade Math Club
Problems for October 9, 2015

Two shapes are *similar* if all linear dimensions of one shape are proportional to the corresponding dimensions of the other shape. For example, a square with side length 10cm is similar to a square with side length 50cm. All linear dimensions in the second square (including the diagonal and the perimeter) will be 5 times as large.

If a two-dimensional shape is similar to another one, but k times as large for some number k, the area of the first shape will be k^2 times as large. We can see this by thinking about a square that we make k times as large. The original square fits into the new square k^2 times. But the same relationship is true for any shape, not just for squares.

1. One quadrilateral has sides of length 1ft. A second quadrilateral has sides of length 2ft. Are the two quadrilaterals necessarily similar?

2. If painting a 10-foot diameter circle requires one two-gallon bucket of paint, how much paint in gallons is needed for a 30-foot diameter circle?

3. The USS Constitution is 204′ long (204 feet). Bob has a scale model of the ship that is 1 foot long. If the mast of Bob's model is 10 inches long, how tall is the mast of the real ship?

4. The two short sides of a right triangle have lengths 3 and 4. Another right triangle's short sides have lengths 6 and 8. If the first right triangle's long side (hypoteneuse) is length 5, what is the length of the second right triangle's hypoteneuse?