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 (hypotenuse) is length 5, what is the length of the second right triangle’s hypotenuse?