Exploring the Values of the Trigonometry Ratios

Task:

What relationships or patterns can you find in the table of trigonometric values on the next page? Write a statement for each, and try to explain why it is true.

Additional Questions:

1. What values can sine, cosine, and tangent be? Why?

2. What happens to the values of the ratios as the angle measure increases?

3. What do you think their values will be when the angle is 90°? Why?

4. Do you notice any values that repeat in the table? Try to describe the patterns precisely, using *x* to represent the measure of an angles, and explain why the patterns work.

5. What fractions are tan(14°) and tan(76°) close to? What pattern might this suggest? Test it out to see if it works for other values, then describe it using *x* to represent one of the angles. Why does it work?

6. Additional patterns you can consider follow. Describe each using *x* to represent an angle, and try to explain why it works.

   a. Look at tan(45°) and tan(60°). Compare them to the cosine and sine values for the angles. What pattern does this suggest?

   b. Calculate $(\cos(29°))^2 + (\sin(29°))^2$. What do you notice?

   c. Will cos(60°) be exactly $\frac{1}{2}$? Why or why not?