13.5 Explore the Law of Sines   TEKS *a.4, a.5, a.6; P.3.E*
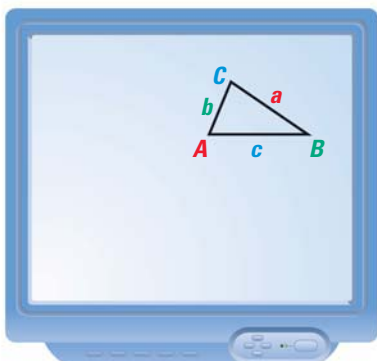
QUESTION How can you use geometry software to explore the law of sines?

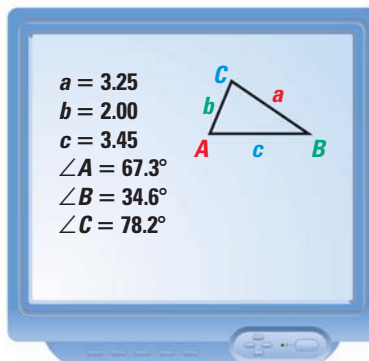**EXPLORE** Investigate a relationship between the angles and sides of a triangle

STEP 1 *Draw a triangle*
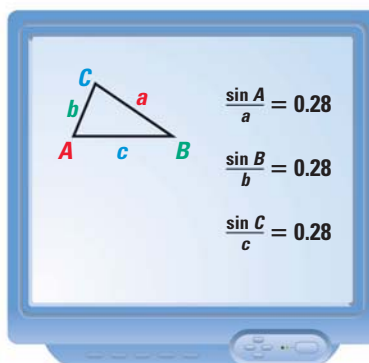Draw △*ABC*. Label the vertices and sides as shown.

STEP 2 *Measure parts of triangle*
Find the side lengths *a*, *b*, and *c*. Also find the measures of angles *A*, *B*, and *C*.

$a = 3.25$
$b = 2.00$
$c = 3.45$
$\angle A = 67.3°$
$\angle B = 34.6°$
$\angle C = 78.2°$

STEP 3 *Calculate ratios*

Find the ratios $\dfrac{\sin A}{a}$, $\dfrac{\sin B}{b}$, and $\dfrac{\sin C}{c}$.

$\dfrac{\sin A}{a} = 0.28$

$\dfrac{\sin B}{b} = 0.28$

$\dfrac{\sin C}{c} = 0.28$

DRAW CONCLUSIONS Use your observations to complete these exercises

1. What are the values of the ratios $\dfrac{\sin A}{a}$, $\dfrac{\sin B}{b}$, and $\dfrac{\sin C}{c}$ for your triangle? What do you notice about these values?

2. Change the shape of your triangle by dragging its vertices, and observe how the ratios you found in Step 3 change. Make a conjecture about how these ratios are related for *any* triangle.