In the diagram at the right, quadrilateral $ABCD$ is a trapezoid with $AB \parallel CD$ and segment lengths as shown.

a. Is $\triangle AED \sim \triangle BEC$? Explain your reasoning.

b. Prove that $\triangle AEB \sim \triangle CED$.

Directions: Be sure to show all your work and explain your answers to get full credit.

1. In the diagram below, $MR \parallel NQ$.
   a. Provide an argument to justify that $\triangle MPR \sim \triangle NQP$.

   b. Use the given measurements to determine each of the following.
      i. $RP$
      ii. $NP$
2. Maya needed to determine the longest distance across Grand Lake. She made the measurements as shown in the diagram.

   a. Provide an argument to justify that $\triangle NPM \sim \triangle RPS$.

   b. Determine $MN$, the longest distance across Grand Lake.

Captain Cook needs to know the distance from his ship to the shore. He knows the measures given and that $\overline{BE} \parallel \overline{CD}$.

Note: The figure is not drawn to scale.

What is the distance $(x)$ from his ship to the shore? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.
24.
Given: \( GH \parallel JK \)
Prove: \( \triangle GHI \sim \triangle KJI \)

25.
Given: \( MQ \parallel NP \)
Prove: \( \triangle QMO \sim \triangle PNO \)

26.
Given: \( \triangle ABD \) and \( \triangle BCD \) are equilateral
Prove: \( \triangle STU \sim \triangle VWX \)

27.
Given: \( \frac{AB}{DC} = \frac{AC}{CE}, AB \parallel CD \)
Prove: \( \triangle ABC \sim \triangle CDE \)
Find the missing length. The triangles in each pair are similar.

When a Ferris wheel casts a 20-meter shadow, a man 1.8 meters tall casts a 2.4-meter shadow. How tall is the Ferris wheel?

A 9-foot ladder leans against a building six feet above the ground. At what height would a 15-foot ladder touch the building if both adders form the same angle with the ground?

Chris wants to reduce a triangle pattern with sides 16, 16, 20 centimeters. If the longest side of the new pattern is to be 15 cm, how long should the other two sides be?