

Real-World Right Triangles: The Ladder Problem

Name: _____ Date: _____

LEARNING OBJECTIVE

Students will apply the Pythagorean Theorem to solve real-world right-triangle problems using a physical model.

MATERIALS NEEDED

- ruler or tape measure
- string (about 3 feet)
- a wall or vertical surface
- masking tape
- calculator
- notebook paper
- pencil

HANDS-ON ACTIVITY

1. Use masking tape to mark a point on the floor 3 feet from the base of a wall (this represents the foot of a ladder).
2. Cut a piece of string to represent a 5-foot ladder (measure and mark 5 feet along the string, or use a tape measure directly).
3. Holding one end of the string at your floor mark, stretch the string toward the wall to find how high up the wall the 'ladder' would reach, keeping the string taut and forming a right angle at the base.
4. Use the Pythagorean Theorem to calculate mathematically how high up the wall a 5-foot ladder would reach if its base is 3 feet from the wall, and compare your calculation to your physical measurement.
5. Repeat the calculation for a 10-foot ladder with its base 6 feet from the wall, and record whether this is a scaled-up version of the same triangle.

QUESTIONS

1. **Using the Pythagorean Theorem, how high up the wall does the 5-foot ladder reach if its base is 3 feet from the wall? Show your work.**

2. **How did your physical measurement compare to your calculation?**

3. For the 10-foot ladder with its base 6 feet from the wall, how high does it reach? Show your work, and explain how this triangle relates to the first one.

4. Why is it dangerous in real life to place a ladder's base too close to or too far from a wall?
