

Application Lesson Opener

For use with pages 543–549

Geometry is a compound of two Greek words meaning “earth” and “measure.” The origin of geometry is generally credited to the ancient Egyptians in their land surveying. Ancient Egyptians would “measure the earth” every year after flooding of the Nile river in order to determine taxes and re-establish property lines. The task of surveying was performed by specialists whose main tool was a rope with knots or marks at equal intervals.

Today we have many sophisticated tools for land surveying. But we also use measuring tapes in the same way that ropes were used thousands of years ago. Here is a common method for measuring a rectangular area of land, using two measuring tapes.

Measure a base line 4 units long. Mark the endpoints A and B . Extend one measuring tape from A and another measuring tape from B to intersect at C . Adjust the two tapes until the tape from B reads 3 units and the tape from A reads 5 units. Mark point C . A square corner has been created at B . Now extend one tape from A and another from B to intersect at D on the same side of $\overline{AB}$ as point C . Adjust the two tapes until the tape from A reads 3 units and the tape from B reads 5 units. Mark point D . A square corner has been created at A . $ABCD$ is a rectangular area that measures 3 units by 4 units. Measure $\overline{AC}$ and $\overline{BD}$ to check for equal diagonals.

1. Draw some diagrams that show the steps of the 3-4-5 method.
2. The Converse of the Pythagorean Theorem states: *If the square of the length of the longest side of a triangle is equal to the sum of the squares of the lengths of the other two sides, then the triangle is a right triangle.* Does the 3-4-5 method rely on the Pythagorean Theorem or on its converse? Explain.
3. How could you use the 3-4-5 method to mark out a rectangular garden area that measures 25 feet by 40 feet? (*Hint: Begin by marking a figure that is 30 feet by 40 feet.*)