THALES: A MAN OF LEGEND

One of the earliest Greek mathematicians we know of is Thales of Miletus (ca 580 B.C.). Knowledgeable in many areas, Thales was also considered a statesman, a counselor, an engineer, a businessman, a philosopher, and an astronomer. Despite the fact that none of his original work has survived, he is well remembered.

One story about Thales has him visiting the Great Pyramid in Egypt, which Egyptian priests exhibited to him to demonstrate Egypt's impressive mathematical development. Thales measured both the length of the shadow the pyramid cast over the sand and his own shadow length, and after a few calculations, he told the priests the pyramid's height. Unaware that Thales had written the proof of the geometric theorem stating that corresponding sides of similar triangles are proportional, the priests were surprised that he so quickly calculated the correct height of the pyramid. We know for certain that this sharing of knowledge was mutual—Thales returned home with new geometric knowledge, some of which he'd gained by observing Egyptian surveyors reestablish land boundaries after the annual flooding of the Nile River.

Thales is also remembered as an adept problem solver. Although there was not enough time to build a permanent bridge, King Croesus of Lydia wanted to get his army's equipment across a river quickly to pursue an enemy. At a loss, the king summoned Thales, who solved the problem at a glance. He instructed the troops to dig a canal, diverting the river water into a temporary channel. After the equipment had been moved across the riverbed, the troops filled the canal, and everything was restored to its natural order.

Egypt wasn't the only center of learning Thales traveled to in his search for knowledge. He studied Babylonian astronomical methods, and some say he predicted an eclipse of the sun in Asia Minor in 585 B.C. Whether he actually predicted the event is questionable, but the eclipse occurred! It took place when the nations Media and Lydia were preparing to fight a battle. When the Median and Lydian armies saw the eclipse, they were so frightened by what they perceived to be a bad omen that they hastily called for peace and retreated to their respective homelands. Modern astronomers have calculated backwards and have determined that the eclipse took place on May 28, 585 B.C. The called-off battle is considered to be the first historical event known to the exact day. ★

Thales is credited with proving these fundamental geometric concepts.

1. A circle is bisected by any diameter.

2. The base angles of an isosceles triangle are equal.

3. If two lines intersect, the vertical angles formed are equal.

4. Two triangles are congruent if they have two angles and one side in each respectively equal.

5. An angle inscribed in a semicircle is a right angle. (Records suggest that this fact was known to the Babylonians some 1,400 years before Thales.)

While these are elementary concepts, Thales was the first to support them with logical reasoning as well as experimentation and intuition.

ACTIVITIES

1. Thales devised a geometric method for measuring the distance of a ship from the shore. What was his method?

2. Work out Thales' calculation of the height (*AC* in the figure shown at left) of Egypt's Great Pyramid. Segment *BD* is a pole or a rod of known length.

Shadow of pole

Shadow of pyramid
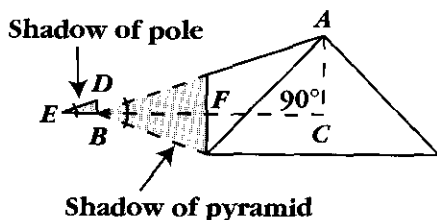
   a. How did Thales find the length of segment *BE*?

   b. How did he calculate *FC*?

   c. What pair of similar triangles did he use to calculate *AC*?

   d. Use what you discovered in 2c to set up a proportion that allows you to calculate *AC*.

3. Measure the height of a tall object in your neighborhood by using the shadow method Thales used to measure the height of the Great Pyramid.

4. Let *P* be any point other than point *A* or point *B* on the circle shown at left.
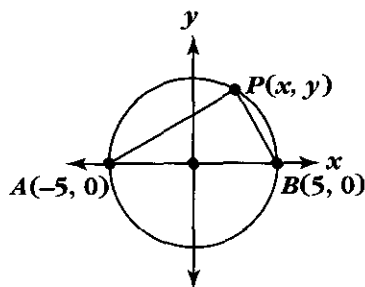
   a. What is the measure of angle *APB*?

   b. Find all the possible integer values for *x* and *y*.

RELATED READING

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