Interdisciplinary Application

For use with pages 295–301

Irrigation

BIOLOGY Irrigation is the artificial watering of land used for plant growth in areas where there is little or no rainfall. Irrigated water comes from sources such as lakes, rivers, and wells. Many factors must be considered before a farmer irrigates crops, such as when to water the crops, how much water to use, how much water is available, and the ability of the soil to hold water.

The use of canals, dams, and reservoirs to help transport and store water is believed to have originated in ancient Egypt, when the Egyptians cultivated farmland that was flooded by the Nile River. These methods of irrigation have evolved over the years and today, approximately 40% of the water used in the United States is for irrigation. Total irrigated land in the world is approximately 600 million acres.

In Exercises 1–5, use the following information.

Surface irrigation is one of the most common types of irrigation in which water runs over the surface of a crop field. A specific type of surface irrigation is called *furrow irrigation*, where ditches, called furrows, are dug across a field and seeds are planted in the ridges between the furrows. Water is carried by pipes and poured out through openings into the furrows.

Suppose a farmer has a portion of farmland partially surrounded by trees and only has enough pipe to set up the furrow irrigation as shown below.
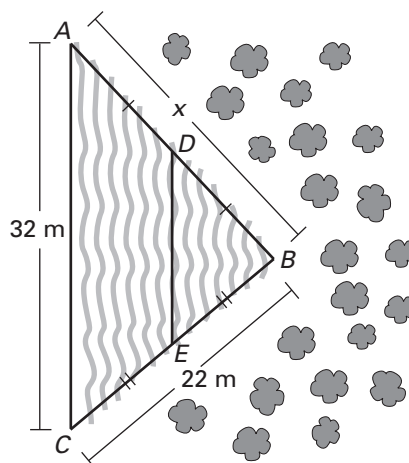
1. What are the possible values of x?
2. What is the length of the furrow shown by $\overline{DE}$?
3. Is it possible for $\overline{AD}$ to have a length of 26 meters? Explain.
4. What happens to $m\angle ABC$ if $\overline{AB}$ is shortened?
5. Determine whether the following lengths are possible for $\triangle ABC$.

   a. 28, 30, 56

   b. 16, 36, 52

   c. 21, 42, 22