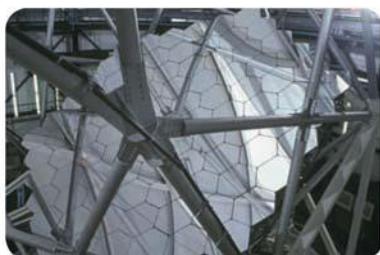# MIXED REVIEW *of Problem Solving*

Lessons 11.4–11.7

1. **MULTI-STEP PROBLEM** The Hobby-Eberly optical telescope is located in Fort Davis, Texas. The telescope's primary mirror is made of 91 small mirrors that form a hexagon. Each small mirror is a regular hexagon with side length 0.5 meter.

   a. Find the apothem of a small mirror.

   b. Find the area of one of the small mirrors.

   c. Find the area of the primary mirror.

2. **GRIDDED ANSWER** As shown, a circle is inscribed in a regular pentagon. The circle and the pentagon have the same center. Find the area of the shaded region. Round to the nearest tenth.

   7
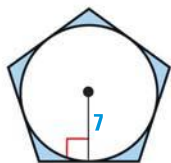
3. **EXTENDED RESPONSE** The diagram shows a projected beam of light from a lighthouse.

   31 mi
   216°
   20 mi
   Lighthouse

   a. Find the area of the water's surface that is illuminated by the lighthouse.

   b. A boat traveling along a straight line is illuminated by the lighthouse for about 31 miles. Find the closest distance between the lighthouse and the boat. *Explain* your steps.

4. **SHORT RESPONSE** At a school fundraiser, a glass jar with a circular base is filled with water. A circular red dish is placed at the bottom of the jar. A person donates a coin by dropping it into the jar. If the coin lands in the dish, the person wins a small prize.

   20 cm
   5 cm

   a. Suppose a coin tossed into the jar has an equally likely chance of landing anywhere on the bottom of the jar, including in the dish. What is the probability that it will land in the dish?

   b. Suppose 400 coins are dropped into the jar. About how many prizes would you expect people to win? *Explain*.

5. **SHORT RESPONSE** The figure is made of a right triangle and three semicircles. Write expressions for the perimeter and area of the figure in terms of π. *Explain* your reasoning.

   $4\sqrt{2}$
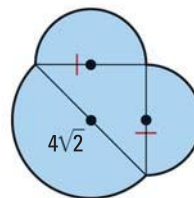
6. **OPEN-ENDED** In general, a fan with a greater area does a better job of moving air and cooling you. The fan below is a sector of a cardboard circle. Give an example of a cardboard fan with a smaller radius that will do a better job of cooling you. The intercepted arc should be less than 180°.

   120°   9 cm