**Open the TI-Nspire document *Application_of_a_Circle_Angles_ and_Arcs.***

In this activity, you will solve a real-world application involving a circle. This will require using the relationships between central angles, inscribed angles, and the arcs they intercept.

1.1 1.2 1.3 ▶ Application_...rcs ▼

Application of a Circle –
Angles and Arcs

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In this activity, you will use relationships among different types of angles and arcs in a circle to solve a real−world application.
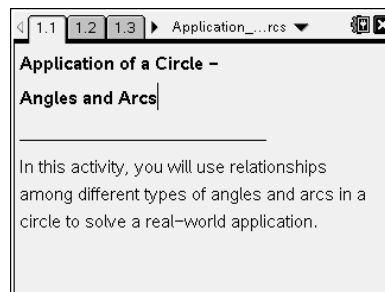
Move to page 1.2.

Press ⓒ� ▶ and ⓒ⊙ ◀ to navigate through the lesson.

Suppose you work for an architectural firm and a new business complex is in the process of being designed. The plans for the complex include a circular courtyard within a square area with side lengths of 8.4 yards. The courtyard will use 10-inch square pavers in different colors to create a design, as shown in the diagram on page 1.4. The points *A*, *B*, *C*, *D*, and *E* represent the points of the star design, and each of the points lies on the circle. Point *Q* represents the center of the circle.

You have been asked to supply the company constructing the courtyard some information that will help with creating the design and ordering supplies.

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1. Would the angles *A*, *B*, *C*, *D*, and *E* be considered central angles or inscribed angles? Explain.

2. What is the relationship between the measures of the angles *A*, *B*, *C*, *D*, and *E* and the arcs they intercept? Explain.

3. Would the arcs intercepted by each of the angles *A*, *B*, *C*, *D*, and *E* be considered major arcs or minor arcs? Explain.

4. In order for the star pattern to be uniform, each of the angles should have the same degree measure. What should be the degree measure of each of the angles *A*, *B*, *C*, *D*, and *E*? Explain your reasoning.

5. Grab and move points *A*, *B*, *C*, *D*, and *E* around the circle until all angle measures are the same. What is the degree measure? Is this what you expected? Explain.

6. What is the diameter of circle *Q*? Explain your reasoning.

Check your answer to Question 6 by using the **Segment** tool (**MENU > Points & Lines > Segment**) to create a segment that represents the diameter of circle *Q*. Use the **Length** tool (**MENU > Measurement > Length**) to find the length of the segment. Change the **Attributes** (**MENU > Actions > Attributes**) of the measurement to one decimal place.

7. Given that the circumference of a circle can be found by using the formula $C = 2\pi r$, where *r* is the radius, find the circumference of circle *Q* to the nearest yard. Show your work below.

Check your answer to Question 7 by using the **Length** tool to find the length of circle *Q*. Change the **Attributes** of the measurement to display zero decimals.

8. Given that the area of a circle can be found by using the formula $A = \pi r^2$, where *r* is the radius, find the area of circle *Q* to the nearest yard. Show your work below.

Check your answer to Question 8 by using the **Area** tool **(MENU > Measurement > Area)** to find the area of circle *Q*. Change the **Attributes** of the measurement to display zero decimals.

9. Given that the pavers being used to construct the courtyard are squares with side lengths of 10 inches, how many pavers will need to be ordered to construct the courtyard? (1 yd^2 = 1,296 in.^{2})