|  |  |  |  |
| --- | --- | --- | --- |
| Name:  Date:  Class/Period: | Topic/Objective: Circles | |  |
| Essential Question: What does pi, , represent? | | | |
| Questions/Key Vocabulary: | | A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the set of all points in a \_\_\_\_\_\_\_\_\_\_that are connected and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from a fixed point of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the circle.  A \_\_\_\_\_\_\_\_\_\_\_\_\_ is usually named by its \_\_\_\_\_\_\_\_\_\_\_\_.  Any \_\_\_\_\_\_\_\_\_\_\_\_\_ with an endpoint at the \_\_\_\_\_\_\_\_\_\_\_\_\_ and an endpoint on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Any \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with endpoints that are on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_\_\_\_\_\_.  A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that passes through the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_\_\_\_, and it measures \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  **Practice:**    Identify the parts of the circle in each space provided below.    If the diameter of circle M is 10 millimeters, what is the length of the radius of circle M?  Can you calculate the length of chord DE? Explain your answer.  **Your turn:**    The diameters of circles M, N, and Y are 40 inches, 100 inches, and 60 inches, respectively.   1. Determine the measure of ON. Justify your answer. 2. Determine the measure of NK. Justify your answer.   What is the term for the distance around a circle?  We know that the Greek letter pi, , is very important for circles. What does represent?  For example, take a circle whose diameter is 1 unit. If you roll it until you get back to the start, how much would it measure?    If then what is the circumference, C, of a circle?  What information is needed to find the circumference of a circle?  **Practice:**  Consider circle G with radius m and circle H with radius b shown below.    Find the circumference of both circles.  Find the ratio of circumference to radius for each circle.  **Your turn:**  Tires from two different trucks are shown. How much farther does Tire A travel compared to Tire B after one revolution?    The army mapped out a war zone in a city. It has a radius of 7 kilometers. What is the circumference of the war zone?  Find the radius of a circle with a circumference of 37.68 inches. Use = 3.14.  **Informal Assessment:**      What is an arc of a circle? How can you find the length of an arc?  Given two points on a circle:   1. An arc length is a portion of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a circle. 2. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ arc is the shortest arc linking both points. The \_\_\_\_\_\_\_\_\_\_\_\_\_ arc is the longest and often defined using another point on the arc, and use all three points to define it. 3. The ratio of the length of an arc to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is equal to the ratio of the measure of arc to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.     **Practice:**  Suppose circles O and P have the same center with radii of 4 and 6 centimeters, respectively. is a minor arc in circle O and is a minor arc in circle P. Both arcs have an angle measure of 360. Are their arc lengths the same? Justify your answer.  **Your turn:**  Estimate the length of if 0. Use 3.14 for .    **Informal Assessment:**  Dominic is riding the Ferris Wheel at the county fair. The Ferris wheel has a radius of 60 ft and rotates counter clockwise. Seats are equidistant from each other.     1. After the ride begins from point a, it pauses at point B. How many feet has Dominic traveled when his seat pauses at point B? 2. About how many feet has Dominic traveled if the full ride is 4 revolutions?   What is the term for the amount of space occupied by any shape?  **Practice for a Circle:**  A circle has a diameter of 18 inches. Find the exact are using and approximate area rounded to the nearest hundredth.  Dale is spreading grass seed over the putting green on a golf course. The circular green has a radius of 30 feet. If each bag of grass seed overs an area of 315 ft2. How many bags of grass seed does Dale need?  Most road and racing bicycles today use 3,038.58 square centimeter rims, though 2,560.52 square centimeter rims are popular with smaller riders and triathletes. What is the difference between the diameters of the rims?  **Informal Assessment:**  A sprinkler rotates in a circular pattern and sprays water over a distance of 25 feet.    What is the approximate area of the circular region covered by the sprinkler?    Let us consider the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the figure below.    A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the region bounded by two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a circle and their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  The ratio of the area, A, of a sector to the area of the circle is equal to the ratio of the measure of the intercepted arc to 3600.    **Practice:**  A circle has a 6 centimeter radius and a shaded sector with a central angle of 600. Determine the area of the shaded sector.  The area of a sector with radius of 8 inches is 74.84 square inches. Calculate the approximate angle of the sector.  **Your turn:**  A lighthouse is situated on the northern tip of an island. Determine the area of water that the light of the lighthouse can cover.    **Informal Assessment:**  In Sarah’s family, the birthday person always gets to cut the first piece of cake. Sarah is celebrating her birthday with both of her parents, her two brothers, and her best friend. She cuts her piece of birthday cake as shown by the sector below.        For one complete \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a circle, we have the circumference, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the size of the circle and determines the arc \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ represent the number of times the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ goes around a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is define by an arc of a circle.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ represents the 3600 needed to complete one revolution.  Therefore, in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the angle around the circle is  To convert from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, multiply the angle by  To convert from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, multiply the angle by  **Practice:**  Perform the following conversions.   1. Convert 1600 to radians. 2. Convert radians to degrees.   What is the length of an arc with a measure of 600 in a circle with a 10-centimeter radius?  **Your turn:**  Convert 3150 to radians.  Convert to degrees.  An arc with a measure of 1200 has an arc length of 10 inches. What is the radius of the circle on with the arc sits?  An arc has a length of 4 units and a radius of 6 units. What is the angle of the sector in radians?  Suppose a circle with an 11.4 inch arc intercepted by the central angle and a radius that is 3 inches long. Determine the measure of the central angle in radians.  The measure of an arc on a circle is equal to the degree measure of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that intercepts the arc.    Consider the figure below. is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angle. is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ arc by both the central angle and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angle.    Define the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angle.  Compare and contrast the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angle and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ arc.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  In a circle, the measure of an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angle is \_\_\_\_\_\_\_\_\_\_\_\_\_ the measure of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angle with the same intercepted arc.  In a circle, two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles with the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ arc are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Any angle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angle.  **Practice:**  Consider circle A in the following figure, and find    **Your turn:**  Consider circle A in the following figure, and find .    **Informal Assessment:**      In a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ every vertex is on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a circle, and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles of the quadrilateral are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Which pair of angles are supplementary?    Find    **Your turn:**  Find the value of each variable.    **Informal Assessment:**    How would you derive the equation of a circle?    To find the radius, you can use the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Now, we find the length of the hypotenuse and the horizontal and vertical legs of the triangle.    Horizontal leg length: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Vertical leg length: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Hypotenuse length: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Substitute these lengths into the Pythagorean Theorem.    This is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_for the equation of a circle with center \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and radius \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  **Practice:**      **Your turn:**        **Informal Assessment:**    Consider the equation written in general form.  x2 + y2 – 10y = 119. How can we use completing the square to show that the equation resembles a circle?  **Practice:**  Complete the square to transform the equation to standard form. What is the center and the radius of the circle? Graph it.        Transformations of Circles:  What transformation(s) will map circle A onto circle B?    Graph the result of a transformation of circle A using the rule (x, y) 🡪 (x + 1, y + 1) followed by a dilation of scale factor two centered at pointA’  Describe where A” will be located if circle A’ is dilated by scale factor two centered at the origin instead of centered at point A’.  **Your turn:**      **Informal Assessment:** | |
| Lesson Summary | | | |