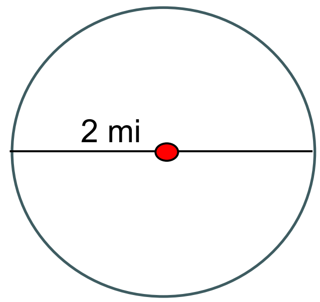
ARC LENGTH AND SECTOR AREA DISCOVERY ACTIVITY TEACHER RESOURCE

A supermarket is looking to open a new location north of its existing location. The store developers have created the diagram below with the existing supermarket at the center of the circle and the available location for the next store above the diameter. Use this information to answer parts A and B on this handout.



<table>
<tr><th>Part A</th><th>Part B</th></tr>
<tr><td>1. Sketch along the edge to show where the supermarket can be opened.

2. Write down the formula for the circumference of a circle. $2\pi r$

3. Using your formula from step 2, what is the actual circumference of the entire circle? (In terms of pi)
2π</td><td>1. Shade the portion of the circle with a central angle of 180 degrees.

2. Write down the formula for the area of a circle.
πr^2

3. Using your formula from step 2, what is the actual area of the entire circle? (In terms of pi)
π</td></tr>
<tr><td colspan="2">4. What is the measure of the central angle of the portion of the circle north of the supermarket? (In degrees)
$180\ degrees$

5. What fraction of the circle is this? (Do Not Reduce)
$\frac{180}{360}$</td></tr>
<tr><td>7. Use your answer from step 3 and step 5 to find the length of the section north of the supermarket. (Find the product of both these values.)

$2\pi \cdot \frac{180}{360} = \pi$

8. Using your calculations in step 7, use your equations from step 2 and step 5 to write a formula to find the length of any arc of a circle (in degrees).
Arc Length = $\frac{x}{360} \cdot 2\pi r$</td><td>7. Use your answer from step 3 and step 5 to find the area of the section of the shaded region of the circle. (Find the product of both these values.)

$\pi \cdot \frac{180}{360} = \frac{\pi}{2}$

8. Using your calculations in step 7, use your equations from step 2 and step 5 to write a formula to find the area of any sector of a circle (in degrees).
Sector area = $\frac{x}{360} \cdot \pi r^2$</td></tr>
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