MAT.07.ER.2.0000G.F.501

Sample Item ID:	MAT.07.ER.2.0000G.F.501
Grade:	07
Primary Claim:	**Claim 2: Problem Solving** Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.
Secondary Claim(s):	
Primary Content Domain:	Geometry
Secondary Content Domain(s):	Ratios and Proportional Relationships
Assessment Target(s):	2 F: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. 2 A: Analyze proportional relationships and use them to solve real-world and mathematical problems.
Standard(s):	7.G.4, 7.RP.3
Mathematical Practice(s):	1, 2, 6
DOK:	2
Item Type:	ER
Score Points:	4
Difficulty:	H
Key:	See Sample Top-Score Response.
Stimulus/Source:	
Target-Specific Attributes (e.g., accessibility issues):	
Notes:	Part of PT set

Consider a circle that has a circumference of 28π centimeters (cm).

Part A

What is the area, in cm^2, of this circle? Show all work necessary to justify your response.

Part B

What would be the measure of the radius, in cm, of a circle with an area that is 20% greater than the circle in *Part A*?
Show all work necessary to justify your response.

Sample Top-Score Response:

Part A

First, I found the radius: $r = \frac{28\pi}{2\pi} = 14$ cm. Then I found the area:

$A = \pi(14^2) = 196\pi$ cm^2. **OR** $A \approx (3.14)(14^2) \approx 615.44$ cm^2.

Part B

First, I multiplied the area of the circle in Part A by 1.20 (which is 20% more than the original): $A = 196\pi(1.20) = 235.2\pi$ cm^2. Then I found the radius by solving the area formula for r:

$$235.2\pi = \pi r^2$$
$$235.2 = r^2$$
$$15.34 \approx r$$

Scoring Rubric:

Responses to this item will receive 0–4 points, based on the following:

4 points: The student shows a thorough understanding of how to solve a real-world problem involving the area and circumference of a circle by using proportional relationships. The student correctly answers both parts and shows sufficient work to justify both answers.

3 points: The student shows a solid understanding of how to solve a real-world problem involving the area and circumference of a circle by using proportional relationships. The student correctly answers both parts but only shows sufficient work to justify one answer. **OR** The student shows sufficient strategy to justify both answers, but makes a computational error that leads to one incorrect answer.

2 points: The student shows a partial understanding of how to solve a real-world problem involving the area and circumference of a circle by using proportional relationships. The student correctly answers *Part A* and shows sufficient work to justify the answer. **OR** The student correctly answers *Part B* based on an incorrect answer to *Part A* and shows sufficient work to justify the answer. **OR** The student shows sufficient strategy to justify both answers, but makes minor computational errors that lead to two incorrect answers.

1 point: The student shows a limited understanding of how to solve a real-life problem involving the area and circumference of a circle by using proportional relationships. The student correctly answers *Part A*. **OR** The student correctly answers *Part B* based on an incorrect answer to *Part A*. **OR** The student shows sufficient strategy to justify an answer to one part, but either answers incorrectly or does not provide an answer.

0 points: The student shows inconsistent or no understanding of how to solve a real-life problem involving the area and circumference of a circle by using proportional relationships.