Area of a Circle

Spot mistakes, reason, and work backward

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

Circle area is $A = \pi r^2$, in square units. For a diameter of 1 m, $r = 0.5$ m and $A = 0.25\pi$ m^2. Halve a disk area for a semicircle; subtract the inner disk area for a ring. Doubling radius makes the area four times as large.

Worked example

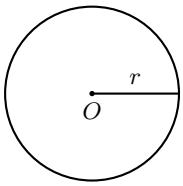
A circle has diameter 3 cm. Find its exact area.

1. Halve the diameter: $r = 3/2 = 1.5$ cm.
2. Square the radius: $1.5^2 = 2.25$ cm^2.
3. Multiply by π: $A = 2.25\pi$ cm^2.
Answer: 2.25π cm^2.

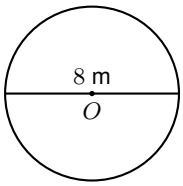
Practice Problems

Show your thinking.

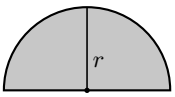
1. A disk has area 9π cm^2. Find its radius and diameter.



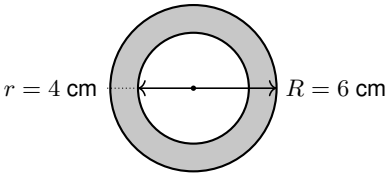
2. A student uses $\pi(8)^2$ for a circle of diameter 8 m. Correct the radius and area. Use 3.14 for π.



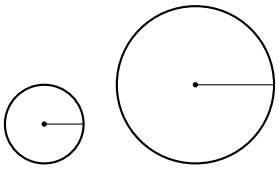
3. A semicircle has area $\frac{25}{2}\pi$ cm^2. Find the full-circle area and radius.



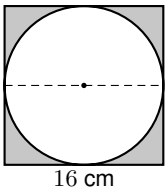
4. A student uses $\pi(6-4)^2$ for a ring with outer radius 6 cm and inner radius 4 cm. Correct the area.



5. A student says doubling radius doubles area. Use radii 7 and 14 cm to explain the true area factor.



6. A student says a disk inscribed in a square of side 16 cm fills it. Find the shaded area left uncovered, exactly.



7. A full circle has area 36π cm^2. Find its radius and the area of a quarter-circle cut from it.

8. A coaster has circumference 11π cm. A student reports its area as 11π cm^2. Explain the mistake and find the exact area.

Answer Key

1. Radius 3 cm; diameter 6 cm.
2. Radius 4 m; area about 50.24 m^2.
3. Full area 25π cm^2; radius 5 cm.
4. 20π cm^2.
5. 49π and 196π cm^2; area factor 4.
6. $(256 - 64\pi)$ cm^2.
7. Radius 6 cm; quarter area 9π cm^2.
8. 30.25π cm^2; 11π cm measures the boundary.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Divide $A = \pi r^2$ by π: $r^2 = 9\pi/\pi = 9$ cm^2.
2. Take the positive square root: $r = \sqrt{9} = 3$ cm.
3. Double the radius: $d = 2(3) = 6$ cm.

Problem 2

1. The 8 m segment is the diameter. Use $r = 8/2 = 4$ m.
2. $A = \pi(4)^2 = 16\pi$ m^2.
3. Using 3.14 for π gives $3.14(16) = 50.24$ m^2.

Problem 3

1. Double the semicircle area: $2\left(\frac{25}{2}\pi\right) = 25\pi$ cm^2.
2. Set $\pi r^2 = 25\pi$ and divide by π: $r^2 = 25$ cm^2.
3. Take the positive square root: $r = \sqrt{25} = 5$ cm.

Problem 4

1. Outer disk: $\pi(6)^2 = 36\pi$ cm^2.
2. Inner hole: $\pi(4)^2 = 16\pi$ cm^2.
3. Subtract areas, not radii: $(36 - 16)\pi = 20\pi$ cm^2.

Problem 5

1. Original area: $A_1 = \pi(7)^2 = 49\pi$ cm^2.
2. New area: $A_2 = \pi(14)^2 = 196\pi$ cm^2.
3. Area factor: $A_2/A_1 = (196\pi)/(49\pi) = 4$.

Problem 6

1. The square area is $16^2 = 256$ cm^2.
2. The square side is the disk diameter: $r = 16/2 = 8$ cm.
3. The disk area is $\pi(8)^2 = 64\pi$ cm^2.
4. Subtract the disk from the square: $(256 - 64\pi)$ cm^2.

Problem 7

1. Divide $\pi r^2 = 36\pi$ by π: $r^2 = 36$ cm^2.
2. Take the positive square root: $r = \sqrt{36} = 6$ cm.
3. Divide the full area by 4: $36\pi/4 = 9\pi$ cm^2.

Problem 8

1. The given 11π cm is a length around the coaster, not area.
2. Solve $2\pi r = 11\pi$ for the radius: $r = 11/2 = 5.5$ cm.
3. Use the area formula: $A = \pi(5.5)^2 = 30.25\pi$ cm^2.

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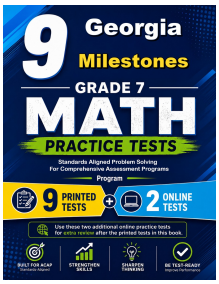

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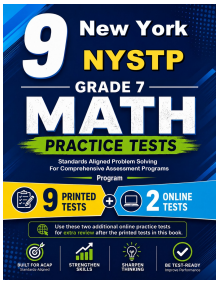

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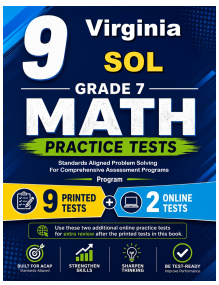

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