Area of a Circle

Explore ideas and representations

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

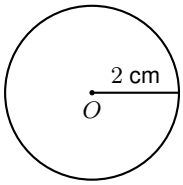
A circle has diameter 3 cm. Find its exact area.

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.

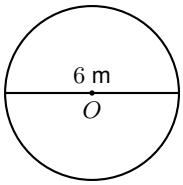
Practice Problems

Show your thinking.

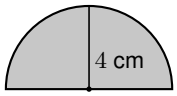
1. Find the exact area of a radius-2 cm circle.



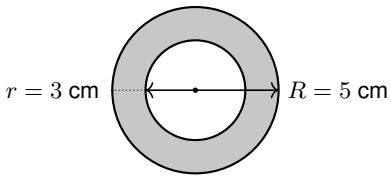
2. A circle has diameter 6 m. Find its area using 3.14 for π.



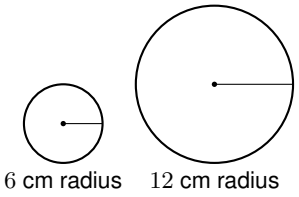
3. Find the exact area of the semicircle of radius 4 cm.



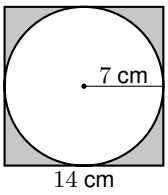
4. Find the shaded ring area with outer radius 5 cm and inner radius 3 cm.



5. A circle radius doubles from 6 cm to 12 cm. Find both areas and the area factor.



6. A radius-7 cm circle is inscribed in a square of side 14 cm. Find the shaded area outside the circle exactly.



7. Find the exact area of a quarter-circle of radius 6 cm.

8. A circular tabletop has radius 0.6 m. Find its exact area in square meters and in square centimeters.

Answer Key

1. 4π cm^2.
2. About 28.26 m^2.
3. 8π cm^2.
4. 16π cm^2.
5. 36π and 144π cm^2; area factor 4.
6. $(196 - 49\pi)$ cm^2.
7. 9π cm^2.
8. 0.36π m^2; 3600π cm^2.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Use the radius 2 cm in $A = \pi r^2$.
2. Square the radius: $2^2 = 4$ cm^2.
3. Multiply by π: $A = 4\pi$ cm^2.

Problem 2

1. The 6 m segment is the diameter. Use $r = 6/2 = 3$ m.
2. $A = \pi(3)^2 = 9\pi$ m^2.
3. Using 3.14 for π gives $3.14(9) = 28.26$ m^2.

Problem 3

1. Square the radius: $4^2 = 16$ cm^2.
2. The full disk would have area 16π cm^2.
3. The shaded region is half of that disk: $16\pi/2 = 8\pi$ cm^2.

Problem 4

1. Outer disk: $\pi(5)^2 = 25\pi$ cm^2.
2. Inner hole: $\pi(3)^2 = 9\pi$ cm^2.
3. Subtract areas, not radii: $(25 - 9)\pi = 16\pi$ cm^2.

Problem 5

1. Original area: $A_1 = \pi(6)^2 = 36\pi$ cm^2.
2. New area: $A_2 = \pi(12)^2 = 144\pi$ cm^2.
3. Area factor: $A_2/A_1 = (144\pi)/(36\pi) = 4$.

Problem 6

1. The square area is $14^2 = 196$ cm^2.
2. The disk area is $\pi(7)^2 = 49\pi$ cm^2.
3. Subtract the disk from the square: $(196 - 49\pi)$ cm^2.

Problem 7

1. Square the radius: $6^2 = 36$ cm^2.
2. The full disk has area 36π cm^2.
3. Divide by 4: $36\pi/4 = 9\pi$ cm^2.

Problem 8

1. Area in square meters: $\pi(0.6)^2 = 0.36\pi$ m^2.
2. As 1 m is 100 cm, 1 m^2 is $100^2 = 10000$ cm^2.
3. Convert the area: $0.36\pi(10000) = 3600\pi$ cm^2.

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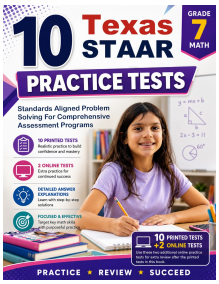

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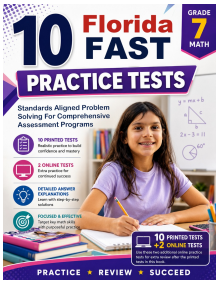

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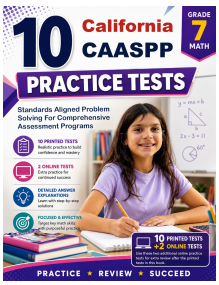

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