Circumference of a Circle

Explore ideas and representations

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

QUICK REVIEW

Circumference is distance around a circle: $C = 2\pi r = \pi d$, in linear units. At $r = 2.5$ cm, $C = 5\pi$ cm. A semicircle perimeter adds its diameter to half the full rim length.

Worked example

Find the exact circumference for a diameter of 7 cm.

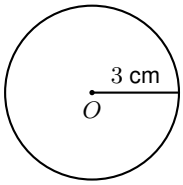
1. Given $d = 7$ cm, the radius is $7/2 = 3.5$ cm.
2. Using the diameter, $C = \pi d = 7\pi$ cm.
3. Using the radius gives the same result: $2\pi(3.5) = 7\pi$ cm.

Answer: 7π cm.

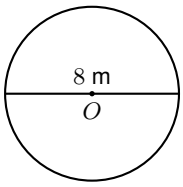
Practice Problems

Show your thinking.

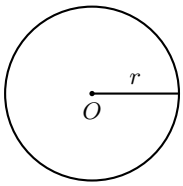
1. Find the circumference of a circle of radius 3 cm. Leave the answer in terms of π.



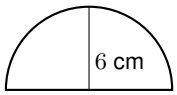
2. The diameter is 8 m. Find the exact circumference and approximate it using 3.14 for π.



3. A circle has circumference 10π cm. Find its radius.

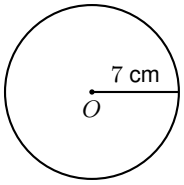


4. Find the exact perimeter of a semicircle of radius 6 cm, including its straight edge.

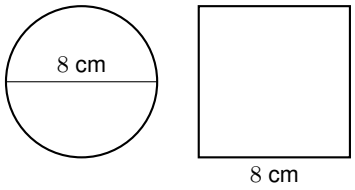


d (straight edge)

5. A wheel of radius 7 cm rolls three complete turns without slipping. Find the exact distance.



6. A square has side 8 cm and a circle has diameter 8 cm. Which has the longer boundary? Use 3.14 for π.



7. A circle has diameter 12 cm. Find the exact length of one quarter of its rim, not the perimeter of a sector.

8. A wheel of radius 4 cm rolls $5/2$ turns without slipping. Find the exact distance.

Answer Key

1. 6π cm.
2. 8π m; about 25.12 m.
3. Radius 5 cm.
4. $(6\pi + 12)$ cm.
5. 42π cm.
6. Square is longer: 32 cm versus 25.12 cm.
7. 3π cm.
8. 20π cm.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The diameter is $2(3) = 6$ cm.
2. The rim length is $C = \pi d = 6\pi$ cm.
3. The result 6π cm is a length, not an area.

Problem 2

1. The full width is $d = 8$ m, so the radius is $8/2 = 4$ m.
2. Use $C = \pi d = 8\pi$ m; the diameter is not doubled.
3. Using 3.14 gives $3.14(8) = 25.12$ m.

Problem 3

1. Set $2\pi r = C = 10\pi$.
2. Divide by 2π: $r = 10\pi/(2\pi) = 5$ cm.
3. Check $2\pi(5) = 10\pi$ cm.

Problem 4

1. The curved edge is half a full circle: $12\pi/2 = 6\pi$ cm.
2. The straight edge is the diameter, $2(6) = 12$ cm.
3. Add both: $P = 6\pi + 12$ cm.

Problem 5

1. Each turn covers $2\pi(7) = 14\pi$ cm.
2. Three equal turns give $3(14\pi) = 42\pi$ cm.
3. Check: $42\pi/(14\pi) = 3$ turns.

Problem 6

1. The square has four equal sides: $P = 4(8) = 32$ cm.
2. The circle has diameter 8 cm: $C \approx 3.14(8) = 25.12$ cm.
3. Compare: $32 > 25.12$, so the square has the longer boundary.

Problem 7

1. The whole rim is $C = \pi(12) = 12\pi$ cm.
2. One quarter of it measures $12\pi/4 = 3\pi$ cm.
3. Four such arcs give $4(3\pi) = 12\pi$ cm, the full rim.

Problem 8

1. One turn covers $2\pi(4) = 8\pi$ cm.
2. Two full turns cover $2(8\pi) = 16\pi$ cm.
3. Add half a turn: $16\pi + 8\pi/2 = 20\pi$ cm.

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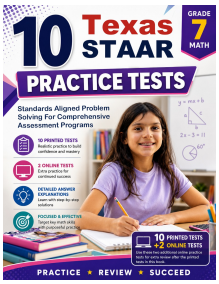

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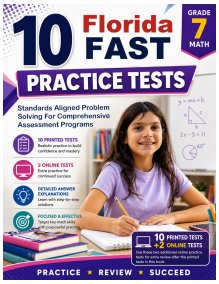

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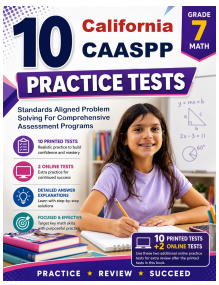

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