Circumference of a Circle

Apply the skill to decisions and designs

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

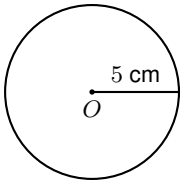
Find the exact circumference for a diameter of 7 cm.

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.

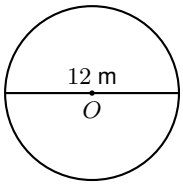
Practice Problems

Show your thinking.

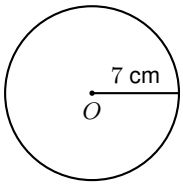
1. A wheel of radius 5 cm rolls one complete turn without slipping. Find the exact distance.



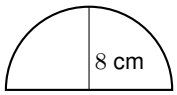
2. A rope is 36.68 m long. Can it go around a garden of diameter 12 m? Use 3.14 for π and find any shortage.



3. Compare the exact rim lengths for radii 7 cm and 8 cm. How much longer is the larger rim?

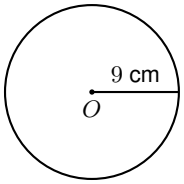


4. A semicircular window has radius 8 cm. Find the exact trim length around its curved and straight edges.

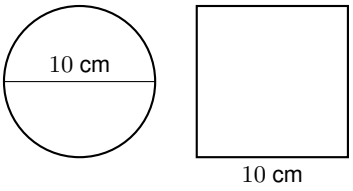


d (straight edge)

5. A radius-9 cm wheel rolls three turns without slipping. Does it travel more than 45π cm? Find the excess if it does.



6. Choose the shorter border: a circle of diameter 10 cm or a square of side 10 cm. Find the saving using 3.14 for π.



7. A circular bed is 9 m across. Edging comes in 2 m packs. Use 3.14 for π and find the minimum packs and leftover edging.

8. A 5 cm radius wheel rolls six turns and a 6 cm radius wheel rolls five turns. Which travels farther without slipping? Find both exact distances.

Answer Key

1. 10π cm.
2. No; about 37.68 m needed, short 1 m.
3. 14π cm and 16π cm; extra 2π cm.
4. $(8\pi + 16)$ cm.
5. Yes; 54π cm, exceeding the target by 9π cm.
6. Choose the circle; save about 8.6 cm.
7. 15 packs; about 1.74 m left.
8. Neither; each travels 60π cm.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The diameter is $2(5) = 10$ cm.
2. The rim length is $C = \pi d = 10\pi$ cm.
3. One full turn travels one rim length, 10π cm.

Problem 2

1. The full width is $d = 12$ m, so the radius is $12/2 = 6$ m.
2. Use $C = \pi d = 12\pi$ m; the diameter is not doubled.
3. Using 3.14 gives $3.14(12) = 37.68$ m.
4. Shortage: $37.68 - 36.68 = 1$ m.

Problem 3

1. Smaller rim: $2\pi(7) = 14\pi$ cm.
2. Larger rim: $2\pi(8) = 16\pi$ cm.
3. Difference: $(16 - 14)\pi = 2\pi$ cm.

Problem 4

1. The curved edge is half a full circle: $16\pi/2 = 8\pi$ cm.
2. The straight edge is the diameter, $2(8) = 16$ cm.
3. Add both: $P = 8\pi + 16$ cm.

Problem 5

1. Each turn covers $2\pi(9) = 18\pi$ cm.
2. Three equal turns give $3(18\pi) = 54\pi$ cm.
3. The excess is $(54 - 45)\pi = 9\pi$ cm.

Problem 6

1. The square has four equal sides: $P = 4(10) = 40$ cm.
2. The circle has diameter 10 cm: $C \approx 3.14(10) = 31.4$ cm.
3. Choose the circle and save $40 - 31.4 = 8.6$ cm using 3.14.

Problem 7

1. The bed needs about $3.14(9) = 28.26$ m of edging.
2. Fourteen packs give 28 m, too short; fifteen give 30 m.
3. Leftover length: $30 - 28.26 = 1.74$ m.

Problem 8

1. The smaller wheel covers $2\pi(5) = 10\pi$ cm per turn.
2. The larger wheel covers $2\pi(6) = 12\pi$ cm per turn.
3. The distances are $6(10\pi) = 60\pi$ cm and $5(12\pi) = 60\pi$ cm, so they tie.

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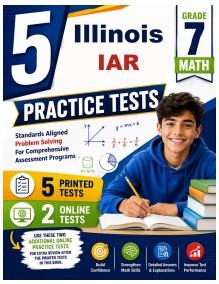

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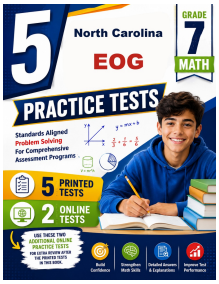

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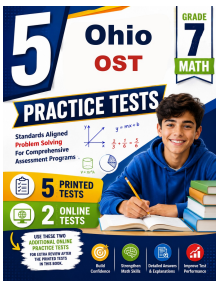

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