

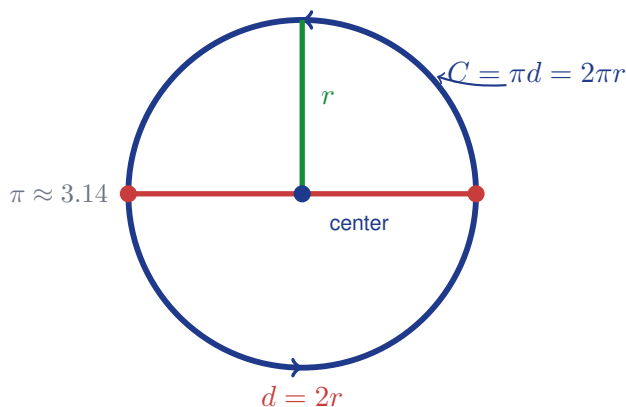
Circumference of Circles

Name: _____

Date: _____

Score: _____ / 17

The **circumference** is the distance all the way around a circle, and here is the amazing part: no matter what circle you measure, the ratio of circumference to diameter is always the same number— π ! That gives you two handy formulas: $C = \pi d$ and $C = 2\pi r$. Learning when to use radius versus diameter, and whether to leave your answer in terms of π or as a decimal, will make every circle problem feel manageable.



Key Concepts & Quick Review

$C = \pi d$ or $C = 2\pi r$ where $d = \text{diameter}$, $r = \text{radius}$, $d = 2r$.

Find d or r from C : $d = \frac{C}{\pi}$; $r = \frac{C}{2\pi}$. Use $\pi \approx 3.14$ unless told to use $\frac{22}{7}$ or leave exact (π).

Examples

① Find the circumference of a circle with: (a) radius 7 cm (b) diameter 15 m . Give exact and approximate answers.

Think It Through: Use the version of the formula that matches the measurement you are given. For part (a), the radius is known, so use $C = 2\pi r = 2\pi(7) = 14\pi$. For part (b), the diameter is given directly, so use $C = \pi d = \pi(15) = 15\pi$. Leave the exact answer with π , then use $\pi \approx 3.14$ for the decimal approximation.

Answer: (a) $14\pi \approx 44.0\text{ cm}$; (b) $15\pi \approx 47.1\text{ m}$

② A bicycle wheel has circumference 188.4 cm . Find its diameter and radius. How many full rotations does it make in 1 km ?

Think It Through: Work backward from circumference to diameter using $d = \frac{C}{\pi}$. That gives $d = \frac{188.4}{3.14} = 60\text{ cm}$, so the radius is half of that: 30 cm . For the number of wheel rotations in 1 km , change 1 km to $100,000\text{ cm}$ so the units match. Then divide total distance by distance per rotation: $100,000 \div 188.4 \approx 531$ rotations.

Answer: $d = 60\text{ cm}$, $r = 30\text{ cm}$; $\approx 531\text{ rotations/km}$



Practice Problems

Find the circumference (use $\pi \approx 3.14$ unless indicated). Leave some exact (π).

- 1. Find the circumference of a circle with radius 5 cm .
- 2. Find the circumference of a circle with radius 9 m .
- 3. Find the circumference of a circle with diameter 14 cm .
- 4. Find the circumference of a circle with diameter 20 m .
- 5. Find the exact circumference of a circle with radius 3.5 cm .
- 6. Find the exact circumference of a circle with diameter 11 cm .



- 7. Find the circumference of a circle with radius $\frac{7}{2}\text{ m}$.



- 8. Find the circumference of a circle with diameter 6 cm .
- 9. A circle has circumference 62.8 . Find its diameter.
- 10. A circle has circumference 31.4 . Find its radius.
- 11. Find the exact circumference of a circle with radius 12 cm .
- 12. Find the circumference of a circle with diameter 25 m .
- 13. A circle has circumference $\pi \times 8$. Find its diameter.
- 14. Find the circumference of a circle with radius 0.5 m .



- 15. Find the circumference of a circle with diameter 4.2 cm .



Study Tips

- Diameter or radius?** Read the problem carefully — $C = \pi d$ uses diameter; $C = 2\pi r$ uses radius. Using the wrong one doubles or halves your answer.
- For an **exact answer**, keep π as a symbol: write $10\pi\text{ cm}$, not 31.4 cm .
- Semicircle perimeter** = half circumference + diameter = $\pi r + 2r$.

Word Problems

- 16. A circular running track has a radius of 40 m . Find the circumference. An athlete wants to run 5 km . How many complete laps must she run? If she runs at 8 km/h , how many minutes will the run take? _____
- 17. A pizza has a diameter of 36 cm . A baker wants to press a decorative crust border around the entire edge. Find the length of border needed. If the dough roll that makes the border is 2 cm wide, what area does the border cover? (Hint: border area $\approx C \times 2$.) _____



Answer Keys

- | | |
|---|---|
| <p>1) 31.4 <i>cm</i></p> <p>2) 56.52 <i>m</i></p> <p>3) 43.96 <i>cm</i></p> <p>4) 62.8 <i>m</i></p> <p>5) 7π <i>cm</i></p> <p>6) 11π <i>cm</i></p> <p>7) 21.98 <i>m</i></p> <p>8) 18.84 <i>cm</i></p> <p>9) 20</p> <p>10) 5</p> | <p>11) 24π <i>cm</i></p> <p>12) 78.5 <i>m</i></p> <p>13) 8</p> <p>14) 3.14 <i>m</i></p> <p>15) 13.19 <i>cm</i></p> <p>16) Circumference about 251.3 <i>m</i>; 20 laps; 37.5 <i>min</i></p> <p>17) Circumference about 113.1 <i>cm</i>; border area about 226.2 <i>cm</i>²</p> |
|---|---|

Step-by-Step Explanations

Strategy: For Triangle Angle-Sum Theorem, add the three interior angles to 180° and keep the unknown angle in that same equation. Once the triangle sum is written, the missing angle is usually one clean subtraction.

Practice 1: A triangle has two angles measuring 40° and 75° . Find the third angle and classify the triangle.

Answer: 65°

At the beginning of the practice, use the fact that the three interior angles of a triangle add to 180 degrees.

Practice 15: An equilateral triangle has three equal angles. Find the measure of each angle. **Answer:** 60°

For the second model problem, use the fact that the three interior angles of a triangle add to 180 degrees.

Word-problem notes:

16. Answer: $2n + 8 + 3n - 12 + 90 = 180 \Rightarrow 5n = 94 \Rightarrow n = 18.8$; angles: 45.6° , 44.4° , 90° — valid right triangle.

A right triangle still follows the same angle-sum rule: the three angles add to 180° . Write $(2n + 8) + (3n - 12) + 90 = 180$. Simplifying gives $5n + 86 = 180$, so $5n = 94$ and $n = 18.8$. Substituting back gives the other two angles as 45.6° and 44.4° . Both are acute, and together with the 90° angle they make a valid right triangle.

17. Answer: $(4k - 5) + (2k + 15) + (k + 10) = 180 \Rightarrow 7k = 160 \Rightarrow k \approx 22.9$; angles: 86.4° , 60.7° , 32.9° ; acute; sharpest turn at peak (32.9°).

Add the three angle expressions and set the sum equal to 180° : $(4k - 5) + (2k + 15) + (k + 10) = 180$. This simplifies to $7k + 20 = 180$, so $7k = 160$ and $k \approx 22.9$. Substituting back gives approximate angles of 86.4° , 60.7° , and 32.9° . Since all three are less than 90° , the route forms an acute triangle. The sharpest turn is the smallest angle, which is at the peak.



Want Even More Practice?

Check Out Our Other South Dakota Smarter Balanced Test Books!



South Dakota Smarter Balanced Grade 7 Math Preparation Bundle

18 full-length practice tests across three books (5 + 6 + 7)
No repeated questions—maximum practice value!



18 Tests!
3 Books
One Bundle

Important: All our test books contain **unique, completely different tests** from each other! Each book offers fresh practice questions—no repeats!

5 Practice Tests

- ✓ 5 complete practice tests with detailed explanations
- ✓ Perfect foundation for Smarter Balanced test preparation
- ✓ Builds confidence and test-taking skills
- ✓ High-quality questions aligned with state standards

Start your practice journey!

6 Practice Tests

- ✓ 6 complete practice tests with detailed explanations
- ✓ **Unique tests**—different from the 5 tests book
- ✓ Perfect for more practice after mastering 5 tests
- ✓ Builds even more confidence and test-taking skills
- ✓ Same high-quality questions aligned with standards

Take your practice to the next level!

7 Practice Tests

- ✓ 7 complete practice tests for maximum preparation
- ✓ **Unique tests**—different from 5 and 6 tests books
- ✓ The most comprehensive practice for Grade 7
- ✓ Ideal for students aiming for top scores
- ✓ Extensive practice builds mastery and confidence

Go all the way with comprehensive practice!