



Learning Objective

Students develop understanding of perimeter, including the circumference of circles and the perimeter of composite shapes combining straight edges and curved boundaries.

Key Concepts

Perimeter of polygons: The sum of all side lengths. For regular polygons, multiply the side length by the number of sides.

Circumference of circles: The distance around a circle.

- Using diameter: $C = \pi d$
- Using radius: $C = 2\pi r$
- Where $\pi \approx 3.14159...$

Composite shapes: When shapes combine straight and curved edges, break the shape into identifiable parts (rectangle, semicircle, quarter circle) and add their individual perimeters, being careful to include only the external boundary.

Teaching Notes

Common Misconceptions

- Students often forget to distinguish between radius and diameter. Use explicit labels and check understanding before moving to calculations.
- When finding perimeter of composite shapes, students may include internal boundaries. Emphasize that we only count the outer edge.
- Remind students that π is irrational; teach them to round appropriately for context (often 1-2 decimal places).

Progression

Foundation: Simple rectangles, squares, triangles, regular polygons, and basic circle circumference using given formula.

Proficient: Real-world context (fencing, running tracks), calculating diameter/radius from circumference, and composite shapes (rectangle with semicircle).

Excellence: Complex composite shapes, sector perimeter, and problem-solving requiring multiple steps.

Common Errors and Corrections

1. **Using radius in place of diameter in $C = \pi d$:** Clarify that $C = \pi d$ specifically uses diameter; if given radius, use $C = 2\pi r$.
2. **Forgetting units:** Emphasize that perimeter has length units (cm, m, etc.).
3. **Incorrect composite shape setup:** Draw and label the shape, then list each segment's length before adding.

Extension Activities

- Explore the relationship between circumference and diameter for various circular objects.
- Design shapes with a fixed perimeter and explore which can enclose the maximum area.
- Calculate actual distances: track lengths, pool perimeters, or garden boundaries.

Resources

Beta Textbook: Chapter 15 (Various sections on perimeter and measurement)