Properties of Two-Dimensional Figures

Grade 5 Math • Section 10.3

Name: _____	Date: _____	Score: _____ / 12

Quick Review and Helpful Hints

Key properties:

- **Parallel sides:** sides that never meet and stay the same distance apart.
- **Perpendicular sides:** sides that meet at a right angle ($90°$).
- **Congruent sides:** sides that have the same length.

Properties of a category apply to all its subcategories. All rectangles are parallelograms, so all rectangle properties include parallelogram properties.

Example: Name all properties shared by all rectangles.

All rectangles have: 4 sides, 4 right angles ($90°$), 2 pairs of parallel sides, and opposite sides that are equal in length. Since every rectangle is also a parallelogram, it inherits all parallelogram properties too.

Answer: 4 right angles, 2 pairs of parallel sides, opposite sides equal

Practice Problems

Identify the properties of each figure.

1. A square has _____ pairs of parallel sides, _____ right angles, and all sides are _____.

   _____

2. A trapezoid has exactly _____ pair(s) of parallel sides.

   _____

3. True or false: All squares are rectangles. _____

   _____

4. True or false: All rectangles are squares. _____

   _____

5. A rhombus has 4 equal sides. Does it always have 4 right angles?

   _____

6. Name a quadrilateral with exactly one pair of parallel sides.

   _____

7. True or false: All parallelograms have opposite sides that are equal. _____

   _____

8. How many right angles does a regular rectangle have?

   _____

9. A regular hexagon has _____ sides of equal length.

   _____

10. True or false: A square is a special type of rhombus.

    _____

Word Problems

11. Mia says, “Since all squares are rectangles, all rectangles must be squares.” Is Mia correct? Explain why or why not using properties.

    _____

12. A stop sign is a regular octagon. How many sides does it have? Are all sides equal in length? How many lines of symmetry does it have?

    _____

Answer Keys

1. 2, 4, equal
2. 1
3. True
4. False
5. No
6. trapezoid
7. True
8. 4
9. 6
10. True
11. No
12. 8; yes; 8

Step-by-Step Explanations

1. Start with the main idea. For 2-D figures, a square has two pairs of parallel sides, four right angles, and equal side lengths. Use the properties one at a time: sides, angles, and parallel sides.

2. Keep the work tidy. For 2-D figures, a trapezoid has exactly one pair of parallel sides. A shape can belong to more than one category when it satisfies more than one definition.

3. Look at what the numbers mean. For 2-D figures, a square has four right angles, so it is a rectangle. Counterexamples are useful: one shape that breaks a claim shows the claim is not always true.

4. Use the setup first. For 2-D figures, a rectangle does not need all four sides equal. Use the properties one at a time: sides, angles, and parallel sides.

5. Check the size of the answer. For 2-D figures, a rhombus has equal sides, but its angles do not have to be right angles. A shape can belong to more than one category when it satisfies more than one definition.

6. Match the operation to the words. For 2-D figures, a trapezoid has exactly one pair of parallel sides. Counterexamples are useful: one shape that breaks a claim shows the claim is not always true.

7. Write the important values first. For 2-D figures, opposite sides of a parallelogram are parallel and equal. Use the properties one at a time: sides, angles, and parallel sides.

8. Follow the pattern carefully. For 2-D figures, every rectangle has four right angles. A shape can belong to more than one category when it satisfies more than one definition.

9. Start with the main idea. For 2-D figures, a hexagon has six sides. Counterexamples are useful: one shape that breaks a claim shows the claim is not always true.

10. Keep the work tidy. For 2-D figures, a square has four equal sides, so it is a rhombus. Use the properties one at a time: sides, angles, and parallel sides.

11. Look at what the numbers mean. For 2-D figures, all squares are rectangles, but rectangles only need opposite sides equal, not all four sides equal. A shape can belong to more than one category when it satisfies more than one definition.

12. Use the setup first. For 2-D figures, a regular octagon has 8 equal sides and 8 lines of symmetry. Counterexamples are useful: one shape that breaks a claim shows the claim is not always true.

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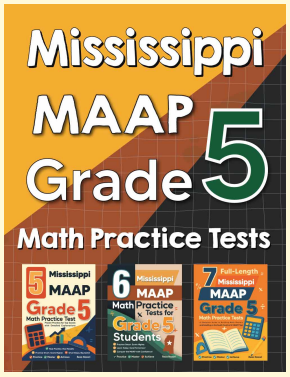

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