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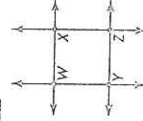
Guided Practice

Do You Understand?

- What geometric term could you use to describe the top and bottom edges of a book? Why?
Parallel lines; Sample answer: They are straight lines that will never touch.
- The blades of an open pair of scissors look like what pair of lines? Why? Intersecting lines; Sample answer: They are straight lines that meet in a point. If they form right angles, they are also perpendicular.

Do You Know How?

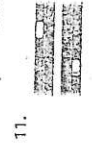
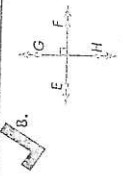
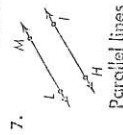
For 3–6, use the diagram.



- Name four points.
 W, X, Y, Z
- Name four lines.
 $\overline{WX}, \overline{WY}, \overline{XZ}, \overline{YZ}$
- Name two pairs of parallel lines.
 \overline{WY} and $\overline{XZ}, \overline{WX}$ and \overline{YZ}
- Name two pairs of perpendicular lines.
Sample answer: \overline{WY} and $\overline{WX}, \overline{WX}$ and \overline{XZ}

Independent Practice

For 7–12, use geometric terms to describe what is shown. Be as specific as possible.

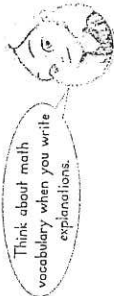


For 13–15, draw what is described by the geometric terms.

- Perpendicular lines
- Intersecting lines
- Parallel lines

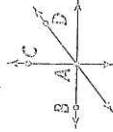
Problem Solving

16. Critique Reasoning Bella names this line LM . Miguel names the line LM . Who is correct? Explain.
Both are correct; Sample answer: Any two points on a line can be used to name it.

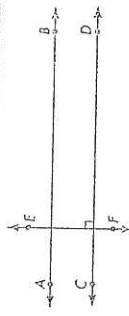


17. Construct Arguments If all perpendicular lines are also intersecting lines, are all intersecting lines also perpendicular lines? Explain.
No; Sample answer: Perpendicular lines intersect and create right angles. Intersecting lines do not always form a right angle.

18. Draw three lines so two of the lines are perpendicular and the third line intersects the perpendicular lines at exactly one point. Label the lines with points.
Sample drawing:

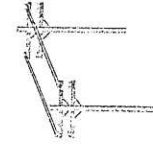


19. Higher Order Thinking \overline{AB} is parallel to \overline{CD} , and \overline{CD} is perpendicular to \overline{EF} . If a line through B and D is perpendicular to \overline{AB} , what is the relationship between \overline{BD} and \overline{EF} ?
 \overline{BD} is parallel to \overline{EF} .

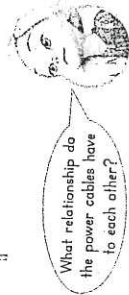


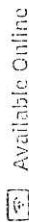
Assess Your Progress

20. Which geometric term would you use to describe the power cables shown at the right?



- Perpendicular lines
- Parallel lines
- Intersecting lines
- Points





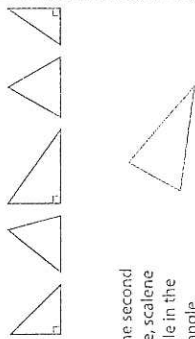
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Another Example!

The pattern follows the rule: right triangle, acute triangle, right triangle, acute triangle.... It also follows the rule: isosceles, scalene, scalene, isosceles, scalene.... Draw a triangle that could be next in the pattern and explain.



For the first rule, the next triangle is acute. For the second rule, it is scalene. So, the next triangle is an acute, scalene triangle. It can be the same as the second triangle in the pattern or it can be a different acute, scalene triangle.

Guided Practice

Do You Understand?

- Is it possible to have an obtuse acute triangle? Explain.
No; Sample answer: A triangle cannot have three acute angles and one obtuse angle.
- Can a triangle have more than one right angle? If so, draw an example.
No; A triangle can have, at most, one right angle.

Do You Know How?

For 3–4, classify each triangle by its sides, and then by its angles.

- Isosceles; acute
- Equilateral; acute

Independent Practice

For 5–10, classify each triangle by its sides, and then by its angles.

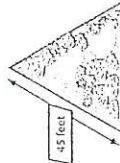
- Scalene; right
- Scalene; obtuse
- Isosceles; right
- Scalene; right
- Isosceles; obtuse
- Scalene; right
- Isosceles; right
- Scalene; right
- Scalene; right
- Scalene; right



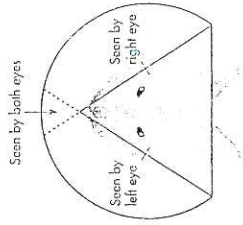
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Problem Solving

- Reasoning** The backyard shown at the right is an equilateral triangle. What do you know about the lengths of the other two sides that are not labeled? Explain.
An equilateral triangle has 3 sides of the same length, so each side is 45 feet long.



- enVision® STEM** A rabbit's field of vision is so wide that it can see predators that approach from behind. The diagram shows the field of vision of one rabbit and the field where the rabbit cannot see. Classify the triangle by its sides and its angles.
Isosceles; acute

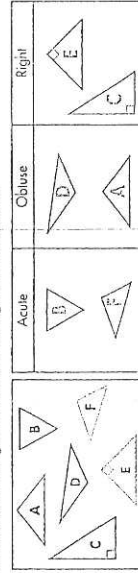


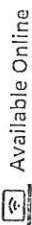
- A pattern follows the rule: obtuse triangle, obtuse triangle, right triangle, obtuse triangle.... It also follows the rule: isosceles, scalene, isosceles, scalene.... Draw a triangle that could be the fifth shape in the pattern and explain.
The fifth shape is an obtuse, isosceles triangle. Check student's drawings.

- Higher Order Thinking** Mitch draws a triangle with one obtuse angle. What are all the possible ways to classify the triangle by its angle measures and side lengths? Explain.
Scalene, obtuse triangle or isosceles, obtuse triangle. Sample answer: The triangle has one obtuse angle, but the side lengths are unknown.

Assessment Practice

- Draw each triangle in its correct angle classification.





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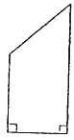


Name _____

Another Example!

Perpendicular sides form right angles. Can a trapezoid have perpendicular sides?

A trapezoid can have two right angles that form perpendicular sides. A trapezoid with two right angles is called a right trapezoid.



Guided Practice

Do You Understand?

1. What is true about all quadrilaterals? They all have 4 sides and 4 angles.
2. What is the difference between a square and a rhombus? A square always has 4 right angles. A rhombus does not always have 4 right angles.
3. Shane drew a quadrilateral with at least 2 right angles and at least 1 pair of parallel sides. Name three quadrilaterals Shane could have drawn. Rectangle, square, and trapezoid

Do You Know How?

For 4–7, write all the names possible for each quadrilateral.

4. Quadrilateral, parallelogram, rectangle
5. Quadrilateral, parallelogram
6. Quadrilateral, parallelogram, square, rhombus
7. Quadrilateral

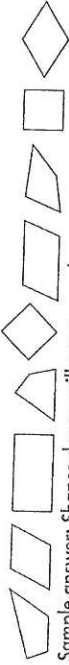
Independent Practice

For 8–11, write all the names possible for each quadrilateral.

8. Quadrilateral, parallelogram
9. Quadrilateral, parallelogram, rhombus
10. Quadrilateral, parallelogram, rhombus, square
11. Quadrilateral, parallelogram, rectangle

Problem Solving

12. The pattern follows the rule: quadrilateral with no parallel sides, quadrilateral with two pairs of parallel sides, quadrilateral with two pairs of parallel sides, quadrilateral with no parallel sides, quadrilateral with two pairs of parallel sides.... Draw quadrilaterals that could be the next three in the pattern.



Sample answer: Shapes drawn will vary; sample shapes are shown.

13. Critique Reasoning Tia says every square is a rectangle and every square is a rhombus, so every rectangle must be a rhombus. Do you agree? Explain.
No; Sample answer: Any rectangle that has 2 pairs of sides of different lengths is not a rhombus.

14. Number Sense What number comes next in the pattern? The rule is "Multiply the position number by itself." Describe a feature of the pattern.
1, 4, 9, 16,
25; Sample answer: The pattern is odd, then even, then odd, etc.

15. Higher Order Thinking Could you use the formula for finding the perimeter of a square to find the perimeter of another quadrilateral? Explain.
Yes; Sample answer: You could use $4 \times s$ to find the perimeter of a rhombus, because all rhombuses have 4 sides of equal length.

The formula for the perimeter of a square is $P = 4 \times s$.



16. Select all the possible names for the shape below.



- Quadrilateral
 Rhombus
 Trapezoid
 Parallelogram
 Rectangle


17. Which shape has only 1 pair of parallel sides?

- A Rhombus
 B Square
 C Right trapezoid
 D Parallelogram

Name _____

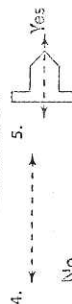
Guided Practice

Do You Understand?

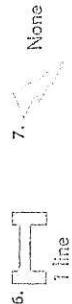
- How many lines of symmetry does the letter R have?
None
- How many lines of symmetry does the figure below have?
 1 line
- How many lines of symmetry can you find for a circle? Do you think you can count them?
Sample answer: A circle has more lines of symmetry than I can count.

Do You Know How?

For 4–5, tell if each line is a line of symmetry.

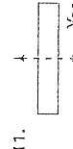
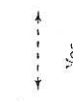
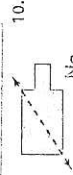


For 6–7, tell how many lines of symmetry each figure has.

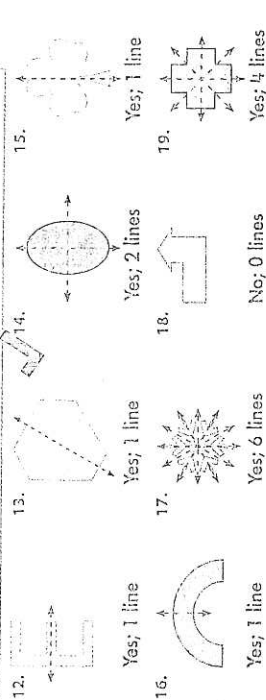


Independent Practice

For 8–11, tell if each line is a line of symmetry.



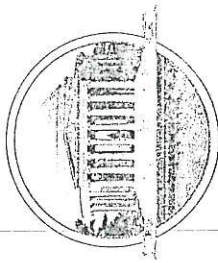
For 12–19, decide if each figure is line symmetric. Draw and tell how many lines of symmetry each figure has.



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Problem Solving

20. The Thomas Jefferson Memorial is located in Washington, D.C. Use the picture of the memorial at the right to decide whether the building is line symmetric. If so, describe where the line of symmetry is.
Yes; Sample answer: It runs vertically from the top center of the dome to the ground.

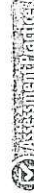


21. Name the type of triangle outlined in green on the picture of the memorial.
Isosceles obtuse

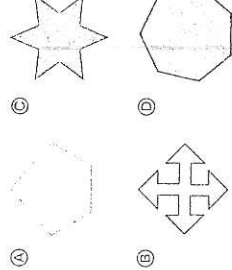


22. Construct Arguments How can you tell when a line is NOT a line of symmetry?
Sample answer: When you fold the figure along the line, the two parts on either side will not match up exactly.

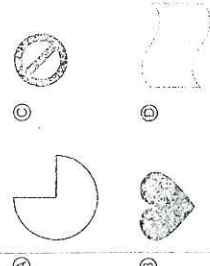
23. Higher Order Thinking How many lines of symmetry can a parallelogram have? Explain.
0, 2, or 4 lines of symmetry; Sample answer: Parallelograms that are not rectangles, rhombuses, or squares have 0 lines of symmetry; Parallelograms that are rectangles or rhombuses but not squares have 2 lines of symmetry; Parallelograms that are also squares have 4 lines of symmetry.



24. Which figure has six lines of symmetry? Draw lines as needed.



25. Which figure is NOT line symmetric?

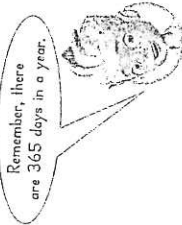


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Problem Solving

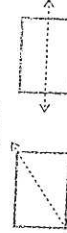
11. Draw a figure that has no lines of symmetry. Check students' drawings.
Sample answer: A circle
12. Vanessa drew a figure that has an infinite number of lines of symmetry. What figure could Vanessa have drawn?
Sample answer: A circle

13. **enVision® STEM** Dogs can smell odors that humans cannot. Dogs can be trained to alert their owners when they smell odors associated with illness. If a dog trains 2 hours every day for 1 year, how many hours has the dog trained?
730 hours



14. **Make Sense and Persevere** Clare trained for a long-distance marathon. She ran a total of 225 miles in 3 months. The first month she ran 50 miles. If she ran 25 more miles each month, how many miles did she run in her third month of training?
100 miles

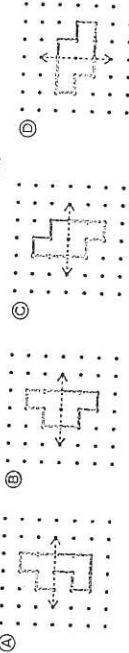
15. **Higher Order Thinking** Can you draw a line that divides a figure in half but is NOT a line of symmetry? Use the figures below to explain.



Yes; Sample answer: The diagonal line divides the rectangle in half, but the diagonal line is not a line of symmetry.

Assess Your Progress

16. Which of the following figures is line symmetric about the dashed line?



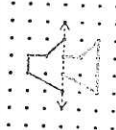
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Guided Practice

Do You Understand?

1. Chandler tried to complete Sarah's design from the previous page. Describe the error Chandler made.

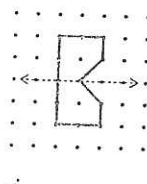
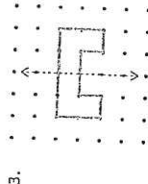


Sample answer: Chandler copied the design on the opposite side of the line of symmetry instead of flipping it over the line of symmetry.

2. How can folding a piece of paper help to determine if a line in a figure is a line of symmetry?
Sample answer: If the two parts of the figure match when the paper is folded on the line, it is a line of symmetry.

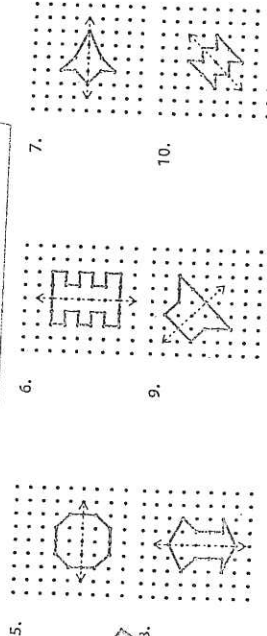
Do You Know How?

For 3–4, use the line of symmetry to draw a line-symmetric figure.



Independent Practice

For 5–10, use the line of symmetry to draw a line-symmetric figure.



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Problem Solving



Dog Pen

Caleb is designing a dog pen for the animal shelter. He has 16 feet of fence, including the gate. His designs and explanation are shown. Critique Caleb's reasoning.

- Reasoning What quantities are given in the problem and what do the numbers mean?

Caleb is designing a dog pen in the shape of a rectangle. He has 16 feet of fence. He drew one that is 4 feet by 4 feet and one that is 2 feet by 5 feet.

- Critique Reasoning What can you do to critique Caleb's thinking?

Sample answer: Check that both designs have a perimeter of 16 feet and that the area of the square is greater than the area of the rectangle.

- Be Precise Did Caleb correctly calculate the perimeter of each fence? Explain.

No; Sample answer: The square uses 16 feet of fence. However, the rectangle only uses 14 feet.

- Critique Reasoning Does Caleb's reasoning make sense? Explain.

Yes; Sample answer: If the second pen is 5 feet long, it should be 3 feet wide, $(2 \times 3) + (2 \times 5) = 6 + 10 = 16$. Its area is $5 \times 3 = 15$ square feet. The square pen has an area of $4 \times 4 = 16$ square feet. Even though Caleb got the length of the second pen incorrect, the square pen still has more area and is the best design.

- Be Precise Explain how you know what units to use in your explanation.

Sample answer: Since the perimeter is given in feet, the lengths of the sides should be in feet and the area should be in square feet.

When you critique reasoning, you ask questions to help understand someone's thinking.



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Guided Practice

Critique Reasoning

Anthony said all multiples of 4 end in 2, 4, or 8. He gave 4, 8, 12, 24, and 28 as examples.

- What is Anthony's argument? How does he support it? Anthony's argument is that all multiples of 4 end in 2, 4, or 8. He supports it by giving 5 multiples that end in one of these digits.
- Describe at least one thing you could do to critique Anthony's reasoning.
Sample answer: Find one multiple of 4 that does not end in 2, 4, or 8.
- Does Anthony's reasoning make sense? Explain.
No; For example, 16 is a multiple of 4 that does not end in 2, 4, or 8.

Independent Practice

Critique Reasoning

Marista said the polygons shown all have the same number of angles as they have sides.

- Describe at least one thing you could do to critique Marista's reasoning.

Sample answer: I could count how many sides and angles each of the polygons have.

- Does Marista's reasoning make sense? Explain.
Yes; Sample answer: The first polygon has 4 sides and 4 angles, the second polygon has 5 sides and 5 angles, and the third polygon has 3 sides and 3 angles. So, all the polygons have the same number of sides as angles.

- Can you think of any examples that prove all polygons don't have the same number of sides as angles? Explain.
No; Sample answer: I drew different polygons and every polygon has the same number of sides as angles.

When you critique reasoning, you decide whether or not another student's conclusion is logical.



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608 Topic 16 | Lesson 16-6

607