

# Grade 4 · Lines, Angles, Shapes and Symmetry

## · Worksheet Answer Key

Common Core 4.G.A.1, 4.G.A.2, 4.G.A.3 · mathovore.fr

Every solution below shows the reasoning step by step, so students can see why an angle is acute or why a figure has a certain number of lines of symmetry. Check each answer, then reread any problem that was missed and look at the figure again.

### Grade 4 Common Core: 4.G.A.1 · 4.G.A.2 · 4.G.A.3

#### Problem 1: Name each figure

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(a) Two endpoints, so it is a **line segment**. (b) One endpoint and an arrow, so it is a **ray**. (c) Arrows on both ends and no endpoints, so it is a **line**. (d) A single dot is a **point**.

#### Problem 2: Count the endpoints

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A line segment has **2** endpoints, a ray has **1** endpoint, and a line has **0** endpoints.

#### Problem 3: Segments on a line

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Pair the points: A and B, B and C, A and C. That makes 3 pairs.

The segments are  $\overline{AB}$ ,  $\overline{BC}$  and  $\overline{AC}$ . **3 line segments**

#### Problem 4: Classify the angles

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(a) It is smaller than a square corner: **acute**. (b) The square mark shows a square corner: **right**. (c) It is wider than a square corner but not a straight line: **obtuse**.

#### Problem 5: Clock angles

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At 3:00 the hands make a square corner: **right**. At 2:00 the hour hand is closer to 12, so the angle is smaller than a square corner: **acute**. At 5:00 the hour hand is past the 3, so the angle is wider than a square corner: **obtuse**.

#### Problem 6: Angles around us

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- a. A paper corner is a square corner: **right**.
- b. Barely open is smaller than a square corner: **acute**.
- c. Tilted far back is wider than a square corner: **obtuse**.

## Problem 7: Parallel or perpendicular

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(a) The lines cross at a slant, with no square corner: **neither**. (b) The lines never meet: **parallel**. (c) The lines cross at a square corner: **perpendicular**.

## Problem 8: Street map

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Oak Street and Pine Street never meet, so they are **parallel**. Main Street crosses each at a square corner, so Main Street is **perpendicular** to Oak Street, and also perpendicular to Pine Street.

## Problem 9: Classify the triangles

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(a) One angle is a square corner: **right triangle**. (b) One angle is wider than a square corner: **obtuse triangle**. (c) All three angles are smaller than a square corner: **acute triangle**.

## Problem 10: Pairs of parallel sides

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(a) Top and bottom are parallel, and the slanted sides are parallel: **2 pairs**. (b) Only the top and bottom are parallel: **1 pair**. (c) No sides stay the same distance apart: **0 pairs**.

## Problem 11: Count right angles

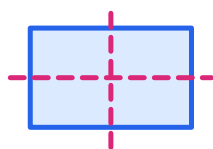
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(a) A rectangle has square corners at all four vertices: **4**. (b) Only the two corners on the left are square: **2**. (c) A slanted parallelogram has no square corners: **0**.

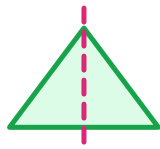
## Problem 12: Lines of symmetry

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(a) The rectangle folds lengthwise and crosswise: **2**. (b) The triangle folds down the middle: **1**. (c) The parallelogram has no fold that matches: **0**. (d) The square folds two ways through the sides and two ways corner to corner: **4**.



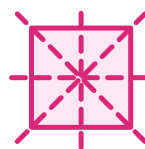
**2 lines**



**1 line**



**0 lines**



**4 lines**

Dashed lines show every line of symmetry.

## Problem 13: True or false

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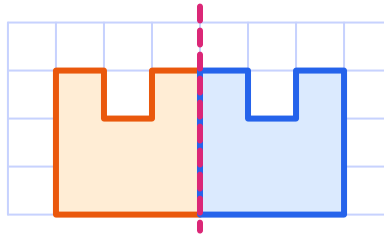
a. **False**. A ray has one endpoint.

- b. **True.**
- c. **False.** Parallel lines never meet.
- d. **False.** An obtuse angle is larger than a right angle.

#### Problem 14: Finish the shape

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Each point on the left side is the same distance from the dashed line as the matching point on the right. The right side is 3 squares wide, so the left side is also 3 squares wide, with a matching notch in the top: 1 square wide, 1 square deep, and 1 square away from the dashed line.



The finished figure (orange is the new half).

#### Problem 15: Square and rectangle

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Yes. A rectangle has 4 square corners and 2 pairs of parallel sides. A square also has 4 square corners, and each side is parallel to the opposite side, so it has 2 pairs too. **Jamal is right.**

#### Problem 16: Letters with symmetry

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H folds two ways, up and down and left and right: **2**. A folds down the middle: **1**. E folds across the middle (top half matches bottom half): **1**. Z has no fold that matches: **0**.

#### Problem 17: Flag stripes

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Flag A: the top and bottom stripes are both red, so the horizontal fold works. The vertical fold also works because every stripe is the same color across. That is **2 lines of symmetry**.

Flag B: the vertical fold works, but folding top onto bottom puts red on blue. That is **1 line of symmetry**.

#### Problem 18: Quadrilateral PQRS

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PS is perpendicular to PQ, so the angle at P is a right angle. PS is also perpendicular to SR, so the angle at S is a right angle. Side QR slants, so the angles at Q and R are not square corners.

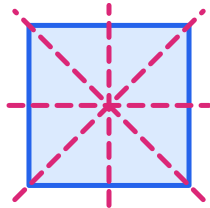
That is **2 right angles** and **1 pair of parallel sides** (PQ and SR). The figure is a **trapezoid**.

### Problem 19: Sandwich cut

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(a) Each piece keeps one square corner of the sandwich, and its other two angles are smaller than a square corner. Each piece is a **right triangle**.

(b) The square has 4 lines of symmetry: 2 through the middles of opposite sides and 2 through opposite corners. **4 lines**



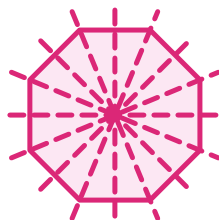
All 4 lines of symmetry.

### Problem 20: Road signs

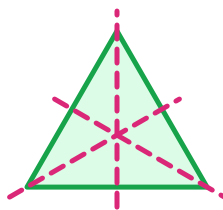
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The stop sign has 8 equal sides, so it has 8 lines of symmetry. The yield sign has 3 equal sides, so it has 3. The house-shaped school sign has 1, straight down the middle.

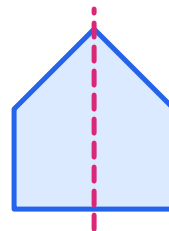
**Stop: 8, yield: 3, school: 1.**



**Stop sign**



**Yield sign**



**School sign**

Dashed lines show the symmetry.

### Problem 21: Skateboard ramp

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The wall is perpendicular to the ground, so the angle where they meet is a right angle. A triangle with one right angle is a **right triangle**.

The other two angles are smaller than a square corner, so **2 angles** are acute.

### Problem 22: Mei's mystery shape

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(a) Two pairs of parallel sides with no square corners make a **parallelogram**.

(b) Four right angles and two pairs of parallel sides make a **rectangle**.