LESSON MAKER PRO

# Angle Detective

*Use quadrilateral clues to find missing angles.*

**GRADE 7 · 7.MG.3.c**

**7.MG.3.c** "Given a diagram, determine an unknown angle measure in a quadrilateral, using properties of quadrilaterals."

NAME _____ DATE _____

## THE BIG IDEA

The four interior angles of any quadrilateral add to 360 degrees. In a parallelogram, opposite angles are equal, and angles next to each other add to 180 degrees. Read the diagram markings before choosing a rule.

## WORKED EXAMPLE

Diagram: W------X / \ Z----------Y m∠W = 105 degrees, m∠Y = 88 degrees, m∠Z = 73 degrees, and m∠X = x. Find x.

1. Add the known angles: 105 + 88 + 73 = 266.
2. Subtract from the total: 360 - 266 = 94.
3. m∠X = 94 degrees, so x = 94.

**Answer: 94 degrees**

## PRACTICE 6 problems

**1** Diagram: A------B / \ D----------C m∠A = 110 degrees, m∠B = 95 degrees, m∠C = 70 degrees, and m∠D = x. Find m∠D.

**ANSWER** _____

**2** Diagram, parallelogram ABCD: A------B / / D------C AB || DC and AD || BC m∠A = 128 degrees and m∠B = x. Find m∠B.

**ANSWER** _____

**3** Diagram, rectangle EFGH: E------F | | H------G All four corners have right-angle marks. m∠F = x. Find x.

**ANSWER** _____

**4** Diagram, trapezoid JKLM: J------K \ \ M------L JK || ML m∠J = 67 degrees and m∠M = x. Find m∠M.

**ANSWER** _____

**5** Diagram, rhombus PQRS: P / \ S Q \ / R m∠P = 72 degrees and m∠R = x. Find m∠R.

**ANSWER** _____

**6** Diagram: A------B / \ D----------C m∠A = x + 22 degrees, m∠B = 106 degrees, m∠C = 79 degrees, and m∠D = 63 degrees. Find m∠A and x.

**ANSWER** _____

## APPLY IT Show your work

**1** Jada makes a slanted frame for her gaming channel thumbnail. The frame is a parallelogram PQRS. Diagram: P------Q / / S------R PQ || SR and PS || QR m∠P = 124 degrees and m∠Q = x. What is m∠Q?

WORK SPACE

**ANSWER** _____

**2** A skate park designer draws a ramp sign shaped like trapezoid JKLM. The top and bottom edges are parallel. Diagram: J------K \ \ M------L JK || ML m∠J = 74 degrees and m∠M = x. What is m∠M?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

**CHALLENGE**

Diagram, parallelogram ABCD: A------B / / D------C AB || DC and AD || BC m∠A = 3x + 12 degrees and m∠C = 5x - 26 degrees. Find x and m∠B. Explain how the diagram helps you.

_____

_____

**ANSWER KEY**

# Angle Detective

**GRADE 7 · 7.MG.3.c**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Diagram: A------B / \ D----------C m∠A = 110 degrees, m∠B = 95 degrees, m∠C = 70 degrees, and m∠D = x. Find m∠D. | **85 degrees** |
| 2 | Diagram, parallelogram ABCD: A------B / / D------C AB \|\| DC and AD \|\| BC m∠A = 128 degrees and m∠B = x. Find m∠B. | **52 degrees** |
| 3 | Diagram, rectangle EFGH: E------F \| \| H------G All four corners have right-angle marks. m∠F = x. Find x. | **90 degrees** |
| 4 | Diagram, trapezoid JKLM: J------K \ \ M------L JK \|\| ML m∠J = 67 degrees and m∠M = x. Find m∠M. | **113 degrees** |
| 5 | Diagram, rhombus PQRS: P / \ S Q \ / R m∠P = 72 degrees and m∠R = x. Find m∠R. | **72 degrees** |
| 6 | Diagram: A------B / \ D----------C m∠A = x + 22 degrees, m∠B = 106 degrees, m∠C = 79 degrees, and m∠D = 63 degrees. Find m∠A and x. | **m∠A = 112 degrees, x = 90** |

## PART 2 · APPLY IT

1. **56 degrees** Angles next to each other in a parallelogram add to 180 degrees. 180 - 124 = 56.
2. **106 degrees** Angles on the same leg between parallel sides add to 180 degrees. 180 - 74 = 106.

## CHALLENGE

**x = 19 and m∠B = 111 degrees. Opposite angles in a parallelogram are equal, so 3x + 12 = 5x - 26. Then m∠A = 69 degrees, and m∠B = 180 - 69 = 111 degrees.**

Accept answers written with a degree symbol or the word degrees. For the algebra items, accept the requested angle measure and x value when both are correct.