Geometry: Solving Parallelograms — Vol. 2

Practice Worksheet • numberbender.com

Name: _____ Date: _____ Score: / 12

DIRECTIONS *In parallelogram ABCD, O is the intersection of the diagonals. Use parallelogram properties to solve for x, y, and missing measures. Show all work.*

1 Consecutive Angles — Solve for x and find both angles:

$\angle A = (5x - 8)^\circ, \quad \angle D = (3x + 12)^\circ$

Answer: _____

2 Opposite Sides — Solve for x and find the side length:

$AB = 4x - 3, \quad CD = 2x + 11$

Answer: _____

3 Diagonals Bisect — Solve for x and find AC:

$AO = 3x + 4, \quad OC = 5x - 8$

Answer: _____

4 Opposite Angles — Solve for x and find m∠P:

$\angle P = (6x - 10)^\circ, \quad \angle R = (4x + 20)^\circ$

Answer: _____

5 Find x and all side lengths. Perimeter = 36:

$AB = 3x + 2, \quad BC = x + 4$

Answer: _____

6 Diagonals Bisect — Solve for x and find BD:

$BO = 2x + 5, \quad OD = 4x - 7$

Answer: _____

7 Consecutive Angles — Find x and all four angle measures:

$\angle A = (3x + 6)^\circ, \quad \angle B = (2x + 14)^\circ$

Answer: _____

8 Opposite Sides — Solve for x and y:

$AB = 3x + y = 16, \quad AD = 2x - y = 4$

Answer: _____

9 Both Diagonals Bisect — Solve for x and y:

$AO = 2x + y,\ OC = 4x - 3,\ BO = 3y - 2,\ OD = y + 8$

Answer: _____

10 Consecutive Angles — Find x and all four angle measures:

$\angle A = (4x + 5)^\circ, \quad \angle B = (x + 15)^\circ$

Answer: _____

11 Find x and all side lengths. Perimeter = 54:

$AB = 4x + 1, \quad BC = 3x - 2$

Answer: _____

12 Opposite Angles — Find x and all four angle measures:

$\angle A = (7x - 5)^\circ, \quad \angle C = (5x + 15)^\circ$

Answer: _____

Scan to watch

Answer Key & Solutions

Geometry: Solving Parallelograms — Vol. 2 • Numberbender

TEACHER NOTES *P1: Opp. sides equal. P2: Opp. angles equal. P3: Consecutive angles sum to 180°. P4: Diagonals bisect each other (AO=OC, BO=OD). Perimeter=2(AB+BC).*

1 Consecutive Angles — Solve for x and find both angles:

$\angle A = (5x - 8)^\circ, \quad \angle D = (3x + 12)^\circ$

= $x = 22,\ m\angle A = 102^\circ,\ m\angle D = 78^\circ$

∠A+∠D=180°: (5x–8)+(3x+12)=180 → 8x=176 → x=22.

2 Opposite Sides — Solve for x and find the side length:

$AB = 4x - 3, \quad CD = 2x + 11$

= $x = 7, \quad AB = CD = 25$

Opposite sides equal: 4x–3=2x+11 → 2x=14 → x=7.

3 Diagonals Bisect — Solve for x and find AC:

$AO = 3x + 4, \quad OC = 5x - 8$

= $x = 6, \quad AC = 44$

AO=OC: 3x+4=5x–8 → 12=2x → x=6. AO=22, AC=2(22)=44.

4 Opposite Angles — Solve for x and find m∠P:

$\angle P = (6x - 10)^\circ, \quad \angle R = (4x + 20)^\circ$

= $x = 15, \quad m\angle P = m\angle R = 80^\circ$

Opposite angles equal: 6x–10=4x+20 → 2x=30 → x=15.

5 Find x and all side lengths. Perimeter = 36:

$AB = 3x + 2, \quad BC = x + 4$

= $x = 3, \quad AB = CD = 11, \quad BC = AD = 7$

2(AB+BC)=36 → AB+BC=18. (3x+2)+(x+4)=18 → 4x=12 → x=3.

6 Diagonals Bisect — Solve for x and find BD:

$BO = 2x + 5, \quad OD = 4x - 7$

= $x = 6, \quad BD = 34$

BO=OD: 2x+5=4x–7 → 12=2x → x=6. BO=17, BD=2(17)=34.

7 Consecutive Angles — Find x and all four angle measures:

$\angle A = (3x + 6)^\circ, \quad \angle B = (2x + 14)^\circ$

= $x = 32,\ \angle A = \angle C = 102^\circ,\ \angle B = \angle D = 78^\circ$

∠A+∠B=180°: 5x+20=180 → x=32. ∠A=102°, ∠B=78°. ∠C=∠A, ∠D=∠B.

8 Opposite Sides — Solve for x and y:

$AB = 3x + y = 16, \quad AD = 2x - y = 4$

= $x = 4, \quad y = 4$

Add equations: 5x=20 → x=4. Sub back: 3(4)+y=16 → y=4.

9 Both Diagonals Bisect — Solve for x and y:

$AO = 2x + y,\ OC = 4x - 3,\ BO = 3y - 2,\ OD = y + 8$

= $x = 4, \quad y = 5$

BO=OD: 3y–2=y+8 → y=5. AO=OC: 2x+5=4x–3 → x=4.

10 Consecutive Angles — Find x and all four angle measures:

$\angle A = (4x + 5)^\circ, \quad \angle B = (x + 15)^\circ$

= $x = 32,\ \angle A = \angle C = 133^\circ,\ \angle B = \angle D = 47^\circ$

∠A+∠B=180°: 5x+20=180 → x=32. ∠A=133°, ∠B=47°.

11 Find x and all side lengths. Perimeter = 54:

$AB = 4x + 1, \quad BC = 3x - 2$

= $x = 4, \quad AB = CD = 17, \quad BC = AD = 10$

2(AB+BC)=54 → AB+BC=27. (4x+1)+(3x–2)=27 → 7x=28 → x=4.

12 Opposite Angles — Find x and all four angle measures:

$\angle A = (7x - 5)^\circ, \quad \angle C = (5x + 15)^\circ$

= $x = 10,\ \angle A = \angle C = 65^\circ,\ \angle B = \angle D = 115^\circ$

∠A=∠C: 7x–5=5x+15 → 2x=20 → x=10. ∠B=180°–65°=115°.

Scan to watch