

Geometry: Square, Rhombus & Rectangle Properties



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DIRECTIONS

Use the properties of each special parallelogram to solve for x and find missing measurements. Identify the shape (Rectangle, Rhombus, or Square) for each problem.

- 1 Rectangle — Opposite sides equal. Solve for x :

$$AB = 3x + 2, \quad CD = 5x - 8$$

Answer: _____

- 2 Rectangle — Diagonals equal. Solve for x :

$$AC = 4x + 1, \quad BD = 6x - 9$$

Answer: _____

- 3 Rectangle — All angles are 90° . Solve for x :

$$\angle B = (3x + 6)^\circ = 90^\circ$$

Answer: _____

- 4 Rectangle — Find x and the perimeter. $BC = 7$:

$$AB = 2x + 3, \quad CD = x + 8$$

Answer: _____

- 5 Rhombus — All sides equal. Solve for x :

$$AB = 5x - 3, \quad BC = 3x + 7$$

Answer: _____

- 6 Rhombus — Opposite angles equal. Solve for x :

$$\angle A = (4x - 10)^\circ, \quad \angle C = (2x + 20)^\circ$$

Answer: _____

- 7 Rhombus — Consecutive angles supplementary. Find x :

$$\angle A = (3x + 15)^\circ, \quad \angle B = (2x + 5)^\circ$$

Answer: _____

- 8 Rhombus — Diagonals bisect each other. Find AC :

$$AE = 2x + 4, \quad CE = 4x - 6$$

Answer: _____

- 9 Square — All sides equal. Solve for x :

$$AB = 4x - 3, \quad BC = 2x + 7$$

Answer: _____

- 10 Square — All angles are 90° . Solve for x :

$$\angle A = (2x + 10)^\circ = 90^\circ$$

Answer: _____

- 11 Square — Find the diagonal. Use $d = s\sqrt{2}$:

$$\text{side} = 8$$

Answer: _____

- 12 Square — Diagonals bisect each other. Find AC :

$$AE = 3x + 1, \quad CE = 5x - 9$$

Answer: _____



Answer Key & Solutions

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TEACHER NOTES

Rectangle: opp. sides =, all $\angle s=90^\circ$, diagonals equal & bisect. Rhombus: all sides =, opp. $\angle s =$, consec. $\angle s$ supp., diagonals perp. bisect. Square: all sides =, all $\angle s=90^\circ$, diagonals equal, perp. & bisect.

- 1 Rectangle — Opposite sides equal. Solve for x:

$$AB = 3x + 2, \quad CD = 5x - 8$$

$$= x = 5, \quad AB = CD = 17$$

Opposite sides equal: $3x+2=5x-8 \rightarrow 10=2x \rightarrow x=5$.

- 2 Rectangle — Diagonals equal. Solve for x:

$$AC = 4x + 1, \quad BD = 6x - 9$$

$$= x = 5, \quad AC = BD = 21$$

Diagonals of a rectangle are equal: $4x+1=6x-9 \rightarrow 10=2x \rightarrow x=5$.

- 3 Rectangle — All angles are 90° . Solve for x:

$$\angle B = (3x + 6)^\circ = 90^\circ$$

$$= x = 28$$

$3x+6=90 \rightarrow 3x=84 \rightarrow x=28$.

- 4 Rectangle — Find x and the perimeter. $BC = 7$:

$$AB = 2x + 3, \quad CD = x + 8$$

$$= x = 5, \quad P = 40$$

$AB=CD: 2x+3=x+8 \rightarrow x=5. AB=13. P=2(13+7)=40$.

- 5 Rhombus — All sides equal. Solve for x:

$$AB = 5x - 3, \quad BC = 3x + 7$$

$$= x = 5, \quad \text{side} = 22$$

All sides equal: $5x-3=3x+7 \rightarrow 2x=10 \rightarrow x=5. \text{Side}=22$.

- 6 Rhombus — Opposite angles equal. Solve for x:

$$\angle A = (4x - 10)^\circ, \quad \angle C = (2x + 20)^\circ$$

$$= x = 15, \quad m\angle A = m\angle C = 50^\circ$$

Opposite angles equal: $4x-10=2x+20 \rightarrow 2x=30 \rightarrow x=15$.

- 7 Rhombus — Consecutive angles supplementary. Find x:

$$\angle A = (3x + 15)^\circ, \quad \angle B = (2x + 5)^\circ$$

$$= x = 32, \quad \angle A = 111^\circ, \quad \angle B = 69^\circ$$

$\angle A+\angle B=180^\circ: (3x+15)+(2x+5)=180 \rightarrow 5x=160 \rightarrow x=32$.

- 8 Rhombus — Diagonals bisect each other. Find AC:

$$AE = 2x + 4, \quad CE = 4x - 6$$

$$= x = 5, \quad AC = 28$$

Diagonals bisect $\rightarrow AE=CE: 2x+4=4x-6 \rightarrow 10=2x \rightarrow x=5. AC=2(14)=28$.

- 9 Square — All sides equal. Solve for x:

$$AB = 4x - 3, \quad BC = 2x + 7$$

$$= x = 5, \quad \text{side} = 17$$

All sides of a square are equal: $4x-3=2x+7 \rightarrow 2x=10 \rightarrow x=5$.

- 10 Square — All angles are 90° . Solve for x:

$$\angle A = (2x + 10)^\circ = 90^\circ$$

$$= x = 40$$

$2x+10=90 \rightarrow 2x=80 \rightarrow x=40$.

- 11 Square — Find the diagonal. Use $d = s\sqrt{2}$:

$$\text{side} = 8$$

$$= d = 8\sqrt{2}$$

Diagonal of square = side $\times \sqrt{2} = 8\sqrt{2} \approx 11.31$.

- 12 Square — Diagonals bisect each other. Find AC:

$$AE = 3x + 1, \quad CE = 5x - 9$$

$$= x = 5, \quad AC = 32$$

$AE=CE: 3x+1=5x-9 \rightarrow 10=2x \rightarrow x=5. AE=16, AC=2(16)=32$.

