

Algebra Word Problems

Lesson 12

Worksheet 12

Algebra Word Problems

Involving

Geometry

Algebra Word Problems – Lesson 12 - Worksheet 12 - Algebra Word Problems
Involving Geometry

Problem 1) The sum of the angles of a triangle is 180 degrees. The second angle is 35 degrees more than the first angle and the third angle is 25 degrees more than the first angle. What are the three angles?

Problem 2) The perimeter of a rectangle is 64 m and its length is 3 times its width. What are the dimensions of the rectangle?

Problem 3) The height of a triangle is 12 hm longer than its base. If its area is 270 square hm, what is the length of the base and the height?

Problem 4) The perimeter of a rectangle is 44 cm and its width is 6 cm longer than its length. What are the dimensions of the rectangle?

Problem 5) The sum of the angles of a triangle is 180 degrees. The second angle is 2 times the measure of the first angle and the third angle is 3 times the measure of the first angle. What are the three angles?

Problem 6) The perimeter of a rectangle is 120 m and its length is 10 m more its width. What are the dimensions of the rectangle?

Problem 7) If the area of a circle is $25\pi m^2$, what is its circumference?

Problem 8) The height of a triangle is 6 cm longer than its base. If its area is 36 square cm, what is the length of the base and the height?

Problem 9) The perimeter of a rectangle is 40 m and its length is 3 times its width. What are the dimensions of the rectangle?

Problem 10) The sum of the angles of a triangle is 180 degrees. The second angle is 40 degrees more than the first angle and the third angle is 5 times the measure of the first angle. What are the three angles?

Problem 11) The angles of a quadrilateral add up to 360° . The measure of the second angle is 15° more than the measure of the first angle, the measure of the third angle is 27° more than the measure of the first angle and the measure of the fourth angle is 38° more than the measure of the first angle. What are the angles of the quadrilateral?

Problem 12) If the area of a circle is $36\pi m^2$, what is its circumference?

Problem 13) The height of a triangle is 8 cm longer than its base. If its area is 64 square cm, what is the length of the base and the height?

Problem 14) The perimeter of a rectangle is 48 m and its length is 5 times its width. What are the dimensions of the rectangle?

Problem 15) The sum of the angles of a triangle is 180 degrees. The second angle is 22 degrees more than the first angle. The third angle is 53 degrees more than the first angle. What are the three angles?

Problem 16) The angles of a quadrilateral add up to 360° . The measure of the second angle is 2 times the measure of the first angle, the measure of the third angle is 3 times the measure of the first angle and the measure of the fourth angle is 4 times the measure of the first angle. What are the angles of the quadrilateral?

Problem 17) If the area of a circle is $81\pi m^2$, what is its circumference?

Problem 18) The sum of the angles of a triangle is 180 degrees. The second angle is 45 degrees more than the first angle and the third angle is also 45 degrees more than the first angle. What are the three angles?

Problem 19) The perimeter of a rectangle is 54 cm and its width is 11 cm longer than its length. What are the dimensions of the rectangle?

Problem 20) The perimeter of a rectangle is 84 m and its length is 3 times its width. What are the dimensions of the rectangle?

Answers - Algebra Word Problems – Lesson 12 - Worksheet 12 - Algebra Word Problems Involving Geometry

Problem 1) The sum of the angles of a triangle is 180 degrees. The second angle is 35 degrees more than the first angle and the third angle is 25 degrees more than the first angle. What are the three angles?

Solution:

Let x represent the first angle. Then the second angle is $x + 35$ and the third angle is $x + 25$. Write an equation showing the sum is 180 and solve for x :

$$x + (x + 35) + (x + 25) = 180$$

$$x + x + 35 + x + 25 = 180$$

$$3x + 60 = 180$$

$$3x = 120$$

$$x = 40$$

If $x = 40$, then $x + 35 = 75$ and $x + 25 = 65$.

Answer: $40^\circ, 75^\circ, 65^\circ$

Problem 2) The perimeter of a rectangle is 64 m and its length is 3 times its width. What are the dimensions of the rectangle?

Solution:

The formula for the perimeter of a rectangle is $P = 2l + 2w$, where p is the perimeter, w is the width and l is the length. Let w represent the width and $3w$ represent the length. Substitute the information from the problem into the formula and solve for w :

$$64 = 2w + 2(3w)$$

$$64 = 2w + 6w$$

$$64 = 8w$$

$$w = 8$$

If $w = 8$, then $l = 3w = 3(8) = 24$

Answer: length: 24 m, width: 8 m

Problem 3) The height of a triangle is 12 hm longer than its base. If its area is 270 square hm, what is the length of the base and the height?

Solution:

The formula for the area of a triangle is $A = \frac{1}{2}bh$ where A is the area, b is the base and h is the height. Let b represent the base and $b + 12$ represent the height. Write and solve an equation:

$$270 = \frac{1}{2}bh = \frac{1}{2}(b)(b + 12)$$

$$270 = \frac{1}{2}b^2 + 6b$$

$$b^2 + 12b - 540 = 0$$

$$(b + 30)(b - 18) = 0$$

$$b = -30 \text{ or } 18$$

The base cannot be negative.

Thus, the base is 18 hm and the height is $(18 + 12)$ hm = 30 hm.

Answer: $b = 18$ hm, $h = 30$ hm

Problem 4) The perimeter of a rectangle is 44 cm and its width is 6 cm longer than its length. What are the dimensions of the rectangle?

Solution:

The formula for the perimeter of a rectangle is $P = 2l + 2w$, where p is the perimeter, l is the length and w is the width. Let l represent the length and $l + 6$ represent the width. Substitute the information from the problem into the formula and solve for l :

$$44 = 2l + 2(l + 6)$$

$$44 = 2l + 2l + 12$$

$$44 = 4l + 12$$

$$32 = 4l$$

$$l = 8$$

If $l = 8$, then $w = l + 6 = 8 + 6 = 14$

Answer: length: 8 cm, width: 14 cm

Problem 5) The sum of the angles of a triangle is 180 degrees. The second angle is 2 times the measure of the first angle and the third angle is 3 times the measure of the first angle. What are the three angles?

Solution:

Let x represent the first angle. Then the second angle is $2x$ and the third angle is $3x$. Write an equation showing the sum is 180 and solve for x :

$$x + (2x) + (3x) = 180$$

$$6x = 180$$

$$x = 30$$

If $x = 30$, then $2x = 60$ and $3x = 90$.

Answer: $30^\circ, 60^\circ, 90^\circ$

Problem 6) The perimeter of a rectangle is 120 m and its length is 10 m more than its width. What are the dimensions of the rectangle?

Solution:

The formula for the perimeter of a rectangle is $P = 2l + 2w$, where p is the perimeter, w is the width and l is the length. Let w represent the width and $w + 10$ represent the length. Substitute the information from the problem into the formula and solve for w :

$$120 = 2w + 2(w + 10)$$

$$120 = 2w + 2w + 20$$

$$120 = 4w + 20$$

$$100 = 4w$$

$$w = 25$$

If $w = 25$, then $l = w + 10 = 35$

Answer: length: 35 m, width: 25 m

Problem 7) If the area of a circle is $25\pi m^2$, what is its circumference?

Solution:

The formula for the area of a circle is $A = \pi r^2$ where A is the area and r is the radius. Use the given area and find the radius:

$$A = \pi r^2 = 25\pi$$

$$r^2 = 25$$

$$r = 5 \text{ m}$$

The formula for the circumference of a circle $C = 2\pi r$. Calculate the circumference:

$$C = 2\pi(5) = 10\pi \text{ m}$$

Answer: $10\pi \text{ m}$

Problem 8) The height of a triangle is 6 cm longer than its base. If its area is 36 square cm, what is the length of the base and the height?

Solution:

The formula for the area of a triangle is $A = \frac{1}{2}bh$ where A is the area, b is the base and h is the height. Let b represent the base and $b + 6$ represent the height. Write and solve an equation:

$$36 = \frac{1}{2}bh = \frac{1}{2}(b)(b + 6)$$

$$36 = \frac{1}{2}b^2 + 3b$$

$$b^2 + 6b - 72 = 0$$

$$(b + 12)(b - 6) = 0$$

$$b = -12 \text{ or } 6$$

The base cannot be negative.

Thus, the base is 6 cm and the height is $(6 + 6)$ cm = 12 cm.

Answer: $b = 6$ cm, $h = 12$ cm

Problem 9) The perimeter of a rectangle is 40 m and its length is 3 times its width. What are the dimensions of the rectangle?

Solution:

The formula for the perimeter of a rectangle is $P = 2l + 2w$, where p is the perimeter, w is the width and l is the length. Let w represent the width and $3w$ represent the length. Substitute the information from the problem into the formula and solve for w :

$$40 = 2w + 2(3w)$$

$$40 = 2w + 6w$$

$$40 = 8w$$

$$w = 5$$

If $w = 5$, then $l = 3w = 3(5) = 15$

Answer: length: 15 m, width: 5 m

Problem 10) The sum of the angles of a triangle is 180 degrees. The second angle is 40 degrees more than the first angle and the third angle is 5 times the measure of the first angle. What are the three angles?

Solution:

Let x represent the first angle. Then the second angle is $x + 40$ and the third angle is $5x$. Write an equation showing the sum is 180 and solve for x :

$$x + (x + 40) + (5x) = 180$$

$$x + x + 40 + 5x = 180$$

$$7x + 40 = 180$$

$$7x = 140$$

$$x = 20$$

If $x = 20$, then $x + 40 = 60$ and $5x = 100$.

Answer: $20^\circ, 60^\circ, 100^\circ$

Problem 11) The angles of a quadrilateral add up to 360° . The measure of the second angle is 15° more than the measure of the first angle, the measure of the third angle is 27° more than the measure of the first angle and the measure of the fourth angle is 38° more than the measure of the first angle. What are the angles of the quadrilateral?

Solution:

Let x represent the measure of the first angle, $x + 15$ be the measure of the second angle, $x + 27$ be the measure of the third angle and $x + 38$ be the measure of the fourth angle. Write an equation that shows the measures of the angles add up to 360.

$$x + (x + 15) + (x + 27) + (x + 38) = 360$$

$$4x + 80 = 360$$

$$4x = 280$$

$$x = 70$$

If $x = 70$, then $x + 15 = 85$, $x + 27 = 97$ and $x + 38 = 108$.

Answer: $70^\circ, 85^\circ, 97^\circ, 108^\circ$

Problem 12) If the area of a circle is $36\pi m^2$, what is its circumference?

Solution:

The formula for the area of a circle is $A = \pi r^2$ where A is the area and r is the radius. Use the given area and find the radius:

$$A = \pi r^2 = 36\pi$$

$$r^2 = 36$$

$$r = 6 \text{ m}$$

The formula for the circumference of a circle $C = 2\pi r$. Calculate the circumference:

$$C = 2\pi(6) = 12\pi \text{ m}$$

Answer: $12\pi \text{ m}$

Problem 13) The height of a triangle is 8 cm longer than its base. If its area is 64 square cm, what is the length of the base and the height?

Solution:

The formula for the area of a triangle is $A = \frac{1}{2}bh$ where A is the area, b is the base and h is the height. Let b represent the base and $b + 8$ represent the height. Write and solve an equation:

$$64 = \frac{1}{2}bh = \frac{1}{2}(b)(b + 8)$$

$$64 = \frac{1}{2}b^2 + 4b$$

$$b^2 + 8b - 64 = 0$$

$$(b + 16)(b - 8) = 0$$

$$b = -16 \text{ or } 8$$

The base cannot be negative.

Thus, the base is 8 cm and the height is $(8 + 8)$ cm = 16 cm.

Answer: $b = 8$ cm, $h = 16$ cm

Problem 14) The perimeter of a rectangle is 48 m and its length is 5 times its width. What are the dimensions of the rectangle?

Solution:

The formula for the perimeter of a rectangle is $P = 2l + 2w$, where p is the perimeter, w is the width and l is the length. Let w represent the width and $5w$ represent the length. Substitute the information from the problem into the formula and solve for w :

$$48 = 2w + 2(5w)$$

$$48 = 2w + 10w$$

$$48 = 12w$$

$$w = 4$$

If $w = 4$, then $l = 5w = 5(4) = 20$.

Answer: length: 20 m, width: 4 m

Problem 15) The sum of the angles of a triangle is 180 degrees. The second angle is 22 degrees more than the first angle and the third angle is 53 degrees more than the first angle. What are the three angles?

Solution:

Let x represent the first angle. Then the second angle is $x + 22$ and the third angle is $x + 53$. Write an equation showing the sum is 180 and solve for x :

$$x + (x + 22) + (x + 53) = 180$$

$$x + x + 22 + x + 53 = 180$$

$$3x + 75 = 180$$

$$3x = 105$$

$$x = 35$$

If $x = 35$, then $x + 22 = 57$ and $x + 53 = 88$.

Answer: $35^\circ, 57^\circ, 88^\circ$

Problem 16) The angles of a quadrilateral add up to 360° . The measure of the second angle is 2 times the measure of the first angle, the measure of the third angle is 3 times the measure of the first angle and the measure of the fourth angle is 4 times the measure of the first angle. What are the angles of the quadrilateral?

Solution:

Let x represent the measure of the first angle, $2x$ be the measure of the second angle, $3x$ be the measure of the third angle and $4x$ be the measure of the fourth angle. Write an equation that shows the measures of the angles add up to 360.

$$x + (2x) + (3x) + (4x) = 360$$

$$10x = 360$$

$$x = 36$$

If $x = 36$, then $2x = 72$, $3x = 108$ and $4x = 144$.

Answer: $36^\circ, 72^\circ, 108^\circ, 144^\circ$

Problem 17) If the area of a circle is $81\pi m^2$, what is its circumference?

Solution:

The formula for the area of a circle is $A = \pi r^2$ where A is the area and r is the radius. Use the given area and find the radius:

$$A = \pi r^2 = 81\pi$$

$$r^2 = 81$$

$$r = 9 \text{ m}$$

The formula for the circumference of a circle $C = 2\pi r$. Calculate the circumference:

$$C = 2\pi(9) = 18\pi \text{ m}$$

Answer: $18\pi \text{ m}$

Problem 18) The sum of the angles of a triangle is 180 degrees. The second angle is 45 degrees more than the first angle and the third angle is also 45 degrees more than the first angle. What are the three angles?

Solution:

Let x represent the first angle. Then the second angle is $x + 45$ and the third angle is $x + 45$. Write an equation showing the sum is 180 and solve for x :

$$x + (x + 45) + (x + 45) = 180$$

$$x + x + 45 + x + 45 = 180$$

$$3x + 90 = 180$$

$$3x = 90$$

$$x = 30$$

If $x = 30$, then $x + 45 = 75$ and $x + 45 = 75$.

Answer: $30^\circ, 75^\circ, 75^\circ$

Problem 19) The perimeter of a rectangle is 54 cm and its width is 11 cm longer than its length. What are the dimensions of the rectangle?

Solution:

The formula for the perimeter of a rectangle is $P = 2l + 2w$, where p is the perimeter, l is the length and w is the width. Let l represent the length and $l + 11$ represent the width. Substitute the information from the problem into the formula and solve for l :

$$54 = 2l + 2(l + 11)$$

$$54 = 2l + 2l + 22$$

$$54 = 4l + 22$$

$$32 = 4l$$

$$l = 8$$

If $l = 8$, then $w = l + 11 = 8 + 11 = 19$.

Answer: length: 8 cm, width: 19 cm

Problem 20) The perimeter of a rectangle is 84 m and its length is 3 times its width. What are the dimensions of the rectangle?

Solution:

The formula for the perimeter of a rectangle is $P = 2l + 2w$, where p is the perimeter, w is the width and l is the length. Let w represent the width and $3w$ represent the length. Substitute the information from the problem into the formula and solve for w :

$$84 = 2w + 2(3w)$$

$$84 = 2w + 6w$$

$$84 = 8w$$

$$w = 10.5$$

If $w = 10.5$, then $l = 3w = 3(10.5) = 31.5$.

Answer: length: 10.5 m, width: 31.5 m
