Review Exercise Set 7

Exercise 1: The product of two consecutive positive odd integers is 35. Determine the two integers.

Exercise 2: The product of two positive integers is 36. Determine the integers if the larger integer is 1 more than twice the smaller integer.

Exercise 3: The area of a rectangle is 300 square feet. Determine the length and width of the rectangle if the length is 5 feet greater than the width. (Hint: the area of a rectangle is the product of the length and width)
Exercise 4: Using the diagram below, solve for the unknown side.

![Diagram of a triangle with sides labeled 6 in, x, and 10 in.]

Exercise 5: The length of a pool is 7 feet greater than the width of the pool. A diagonal across the pool is 8 feet greater than the width of the pool. Find the length of the diagonal across the pool.
Review Exercise Set 7 Answer Key

Exercise 1: The product of two consecutive positive odd integers is 35. Determine the two integers.

Assign variable expressions to the two integers

\[ x = \text{first consecutive positive odd integer} \]
\[ x + 2 = \text{second consecutive positive odd integer} \]

Setup the equation

\[ x(x + 2) = 35 \]

Solve for \( x \)

\[ x^2 + 2x = 35 \]
\[ x^2 + 2x - 35 = 0 \]
\[ (x + 7)(x - 5) = 0 \]

\[ x + 7 = 0 \text{ or } x - 5 = 0 \]
\[ x = -7 \text{ or } x = 5 \]

Since we were told that the integers must be positive, \( x = -7 \) cannot be a solution for this problem. Therefore, \( x \) will be 5.

\[ x + 2 = 5 + 2 = 7 \]

The two consecutive positive odd integers are 5 and 7.

Exercise 2: The product of two positive integers is 36. Determine the integers if the larger integer is 1 more than twice the smaller integer.

Assign variable expressions to the two integers

\[ x = \text{smaller positive integer} \]
\[ 2x + 1 = \text{larger positive integer} \]

Setup the equation

\[ x(2x + 1) = 36 \]

Solve for \( x \)

\[ x(2x + 1) = 36 \]
\[ 2x^2 + x = 36 \]
\[ 2x^2 + x - 36 = 0 \]
(2x + 9)(x - 4) = 0

2x + 9 = 0 or x - 4 = 0
2x = -9 or x = 4
x = -\frac{9}{2} or x = 4

The only possible answer is x = 4 because \(-\frac{9}{2}\) is not positive and it is not an integer.

2x + 1 = 2(4) + 1 = 8 + 1 = 9

The two positive integers are 4 and 9.

Exercise 3: The area of a rectangle is 300 square feet. Determine the length and width of the rectangle if the length is 5 feet greater than the width. (Hint: the area of a rectangle is the product of the length and width)

Assign variable expressions to the dimensions of the rectangle

x = width
x + 5 = length

Setup the equation

x(x + 5) = 300

Solve for x

x(x + 5) = 300
x^2 + 5x = 300
x^2 + 5x - 300 = 0
(x + 20)(x - 15) = 0

x + 20 = 0 or x - 15 = 0
x = -20 or x = 15

The variable x represents the width of the pool and cannot be a negative measurement. Therefore, x = 15 is our solution to the equation.

x + 5 = 15 + 5 = 20

The measurements of the pool are 15 feet for the width and 20 feet for the length.
Exercise 4: Using the diagram below, solve for the unknown side.

Since the triangle is a right triangle we can use the Pythagorean Theorem to solve for the unknown side.

\[ a^2 + b^2 = c^2 \]

Let \( x \) equal one of the legs of the triangle

\( x = b \)

Substitute in the known values, for \( a \) and \( c \), and then solve for \( x \)

\[ a^2 + b^2 = c^2 \]
\[ (6)^2 + x^2 = (10)^2 \]
\[ 36 + x^2 = 100 \]
\[ 36 + x^2 - 100 = 0 \]
\[ x^2 - 64 = 0 \]
\[ (x - 8)(x + 8) = 0 \]

\( x - 8 = 0 \) or \( x + 8 = 0 \)
\( x = 8 \) or \( x = -8 \)

Since we are dealing with a measurement, the answer must be positive. So \( x = 8 \) is our solution.

The length of the unknown side is 8 inches.
Exercise 5: The length of a pool is 7 feet greater than the width of the pool. A diagonal across the pool is 8 feet greater than the width of the pool. Find the length of the diagonal across the pool.

Assign variable expressions to the dimensions of the rectangle

\[ x = \text{width} \]
\[ x + 7 = \text{length} \]
\[ x + 8 = \text{diagonal} \]

Setup the equation

The width, length, and diagonal of the pool would form a right triangle so we can use the Pythagorean Theorem to setup the equation.

\[ a^2 + b^2 = c^2 \]
\[ (x)^2 + (x + 7)^2 = (x + 8)^2 \]

Solve for \( x \)

\[ (x)^2 + (x + 7)^2 = (x + 8)^2 \]
\[ x^2 + x^2 + 7x + 7x + 49 = x^2 + 8x + 8x + 64 \]
\[ 2x^2 + 14x + 49 = x^2 + 16x + 64 \]
\[ 2x^2 - x^2 + 14x - 16x + 49 - 64 = 0 \]
\[ x^2 - 2x - 15 = 0 \]
\[ (x - 5)(x + 3) = 0 \]

\[ x - 5 = 0 \text{ or } x + 3 = 0 \]
\[ x = 5 \text{ or } x = -3 \]

The measurements of the pool cannot be negative, so \( x = 5 \).

\[ x + 7 = 5 + 7 = 12 \]

The length of the pool is 12 feet.