Algebra Word Problems

Lesson 2

Worksheet 2

Algebra Word Problems –

Digit Problems

Algebra Word Problems – Lesson 2 - Worksheet 2 - Algebra Word Problems – Digit Problems

Problem 1) The sum of the digits in a two-digit number is seven. If the tens digit is three less than the ones digit, find the number.

Problem 2) The sum of the digits in a two-digit number is thirteen. If the digits of the number are reversed, the new number is nine more than the original number. What is the original number?

Problem 3) The sum of the digits in a two-digit number is sixteen. If the tens digit is two less than the ones digit, find the number.

Problem 4) In a three-digit number, the hundreds digit is three times the tens digit. The tens digit is three times the ones digit. If the sum of the digits is thirteen, find the number.

Problem 5) The sum of the digits in a two-digit number is fifteen. If the tens digit is three less than the ones digit, find the number.

Problem 6) The sum of the digits in a two-digit number is thirteen. If the digits of the number are reversed, the new number is twenty-seven less than the original number. What is the original number?

Problem 7) The sum of the digits in a two-digit number is 8. If the tens digit is three times the ones digit, find the number.

Problem 8) In a three-digit number, the hundreds digit is one half of the tens digit. The tens digit is twice the ones digit. If the sum of the digits is eight, find the number.

Problem 9) The sum of the digits in a two-digit number is seven. If the tens digit is five less than the ones digit, find the number.

Problem 10) The sum of the digits in a two-digit number is fourteen. If the digits of the number are reversed, the new number is thirty-six more than the original number. What is the original number?

Problem 11) The sum of the digits in a two-digit number is nine. If the tens digit is seven less than the ones digit, find the number.

Problem 12) In a three-digit number, the hundreds digit is two more than the tens digit. The tens digit is three more than the ones digit. If the sum of the digits is fourteen, find the number.

Problem 13) The sum of the digits in a two-digit number is twelve. If the tens digit is four more than the ones digit, find the number.

Problem 14) The sum of the digits in a two-digit number is three. If the digits of the number are reversed, the new number is nine less than the original number. What is the original number?

Problem 15) The sum of the digits in a two-digit number is fifteen. If the tens digit is one more than the ones digit, find the number.

Problem 16) In a three-digit number, the hundreds digit is two less than the tens digit. The ones digit is six more than the tens digit. If the sum of the digits is thirteen, find the number.

Problem 17) The sum of the digits in a two-digit number is six. If the tens digit is two more than the ones digit, find the number.

Problem 18) The sum of the digits in a two-digit number is nine. If the tens digit is five more than the ones digit, find the number.

Problem 19) The sum of the digits in a two-digit number is eleven. If the tens digit is three less than the ones digit, find the number.

Problem 20) In a three-digit number, the hundreds digit is two more than the tens digit. The ones digit is two less than the tens digit. If the sum of the digits is twenty-one, find the number.

Answers - Algebra Word Problems – Lesson 2 - Worksheet 2 - Algebra Word Problems – Digit Problems

Problem 1) The sum of the digits in a two-digit number is seven. If the tens digit is three less than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that $x + y = 7$ and $x = y - 3$.

Substitute $y - 3$ for x in the first equation and solve for y:

$$(y - 3) + y = 7$$

$$2y - 3 = 7$$

$$2y = 10$$

$$y = 5$$

Use $y = 5$ to find x:

$$x = 7 - 5 = 2$$

The number xy is 25

Answer: 25

Problem 2) The sum of the digits in a two-digit number is thirteen. If the digits of the number are reversed, the new number is nine more than the original number. What is the original number?

Solution:

Let the two digit number be xy. Then the reversed digits number is yx.

From the problem, we know that $x + y = 13$.

Then, we can write an equation equating the digits of the two numbers:

$$10y + x - (10x + y) = 9$$

$$10y + x - 10x - y = 9$$

$$9y - 9x = 9$$

This equation can be simplified to: $y - x = 1$

Isolate y:

$$y - x = 1$$

$$y = x + 1$$

Substitute this expression into the equation $x + y = 13$ and solve for x:

$$x + (x + 1) = 13$$

$$2x + 1 = 13$$

$$2x = 12$$

$$x = 6$$

Use $x = 6$ to find y:

$$6 + y = 13$$

$$y = 7$$

The original number xy is 67.

Answer: 67

Problem 3) The sum of the digits in a two-digit number is sixteen. If the tens digit is two less than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that $x + y = 16$ and $x = y - 2$.

Substitute $y - 2$ into the first equation for x and solve for y:

$$(y - 2) + y = 16$$

$$2y - 2 = 16$$

$$2y = 18$$

$$y = 9$$

Use $y = 9$ to solve for x in the first equation:

$$x + 9 = 16$$

$$x = 7$$

The number xy is 79.

Answer: 79

Problem 4) In a three-digit number, the hundreds digit is three times the tens digit. The tens digit is three times the ones digit. If the sum of the digits is thirteen, find the number.

Solution:

Let the three digit number be xyz. From the problem, we can write the following equations:

$$x + y + z = 13$$

$$y = 3z$$

$$x = 3y = 3(3z) = 9z$$

Substituting from these last two equations we have:

$$(9z) + (3z) + z = 13$$

$$13z = 13$$

$$z = 1$$

Use $z = 1$ to find x and y:

$$y = 3(1) = 3$$

$$x = 9(1) = 9$$

The number xyz is 931.

Answer: 931

Problem 5) The sum of the digits in a two-digit number is fifteen. If the tens digit is three less than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that $x + y = 15$ and $x = y - 3$.

Substitute $y - 3$ into the first equation for x and find y:

$$(y - 3) + y = 15$$

$$2y - 3 = 15$$

$$2y = 18$$

$$y = 9$$

Use $y = 6$ in the first equation and solve for x:

$$x + 9 = 15$$

$$x = 6$$

The number xy is 69.

Answer: 69

Problem 6) The sum of the digits in a two-digit number is thirteen. If the digits of the number are reversed, the new number is twenty-seven less than the original number. What is the original number?

Solution:

Let the two digit number be xy. Then, the reversed digits number is yx.

From the problem, we know that $x + y = 13$.

Then we can write an equation equating the digits of the two numbers:

$$10x + y - (10y + x) = 27$$

$$10x + y - 10y - x = 27$$

$$9x - 9y = 27$$

This equation can be simplified to become $x - y = 3$.

Isolate y and we have $x = y + 3$. Substitute $y + 3$ into the first equation for x and solve for y:

$$y + 3 + y = 13$$

$$2y + 3 = 13$$

$$2y = 10$$

$$y = 5$$

Use $x = 8$ to find y using the first equation:

$$x + 5 = 13$$

$$x = 8$$

The number xy is 85

Answer: 85

Problem 7) The sum of the digits in a two-digit number is eight. If the tens digit is three times the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that $x = 3y$ and $x + y = 8$.

Substitute $3y$ for x in the equation $x + y = 8$ and solve for y:

$$(3y) + y = 8$$

$$4y = 8$$

$$y = 2$$

Use $y = 2$ in the equation $x = 3y$ to solve for x:

$$x = 3(2) = 6.$$

The number xy is 62.

Answer: 62

Problem 8) In a three-digit number, the hundreds digit is one half of the tens digit. The tens digit is twice the ones digit. If the sum of the digits is eight, find the number.

Solution:

Let the three digit number be xyz. From the problem, we can write the following equations:

$$x + y + z = 8$$

$$y = 2z$$

$$x = \frac{1}{2}y = \frac{1}{2}(2z) = z$$

Substituting from these equations into the first equation we have:

$$z + 2z + z = 8$$

Solve for z:

$$4z = 8$$

$$z = 2$$

Use $z = 2$ to find x and y:

$$x = z = 2$$

$$y = 2z = 2(2) = 4$$

The number xyz is 242.

Answer: 242

Problem 9) The sum of the digits in a two-digit number is seven. If the tens digit is five less than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that

$$x + y = 7$$

$$x = y - 5.$$

Substitute $y - 5$ for x in the first equation and find y:

$$(y - 5) + y = 7$$

$$2y - 5 = 7$$

$$2y = 12$$

$$y = 6$$

Use $y = 6$ in the first equation to find x:

$$x + 6 = 7$$

$$x = 1$$

The number xy is 16.

Answer: 16

Problem 10) The sum of the digits in a two-digit number is fourteen. If the digits of the number are reversed, the new number is thirty-six more than the original number. What is the original number?

Solution:

Let the two digit number be xy. Then, the reversed digits number is yx.

From the problem, we know that $x + y = 14$.

Then, we can write an equation equating the digits of the two numbers:

$$10y + x - (10x + y) = 36$$

$$10y + x - 10x - y = 36$$

$$9y - 9x = 36$$

This equation can be simplified to become $y - x = 4$.

Isolating y gives us

$$y = x + 4$$

Substitute this expression into the first equaton and solve for x:

$$x + (x + 4) = 14$$

$$2x + 4 = 14$$

$$2x = 10$$

$$x = 5$$

Use $x = 5$ in the first equation and solve for y:

$$5 + y = 14$$

$$y = 9$$

The number xy is 59.

Answer: 59

Problem 11) The sum of the digits in a two-digit number is nine. If the tens digit is seven less than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that

$$x + y = 9$$

$$x = y - 7$$

Substitute $y - 7$ into the first equation for x and solve fore y:

$$(y - 7) + y = 9$$

$$2y - 7 = 9$$

$$2y = 16$$

$$y = 8$$

Use $y = 8$ in the equation $x + y = 9$ to solve for x:

$$x + 8 = 9$$

$$x = 1$$

The number xy is 18.

Answer: 18

Problem 12) In a three-digit number, the hundreds digit is two more than the tens digit. The tens digit is three more than the ones digit. If the sum of the digits is fourteen, find the number.

Solution:

Let the three digit number be xyz. From the problem, we can write the following equations:

$$x + y + z = 14$$

$$y = z + 3$$

$$x = y + 2 = (z + 3) + 2 = z + 5$$

Substituting from these equations we have:

$$(z + 5) + (z + 3) + z = 14$$

$$3z + 8 = 14$$

$$3z = 6$$

$$z = 2$$

Use $z = 2$ to find x and y:

$$x = z + 5 = 2 + 5 = 7$$

$$y = z + 3 = 2 + 3 = 5$$

The number xyz is 752.

Answer: 752

Problem 13) The sum of the digits in a two-digit number is twelve. If the tens digit is four more than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that

$$x + y = 12$$

$$x = y + 4.$$

Substitute $y + 4$ into the first equation for x and solve for y:

$$(y + 4) + y = 12$$

$$2y + 4 = 12$$

$$2y = 8$$

$$y = 4$$

Use $y = 4$ in the first equation to find x:

$$x + 4 = 12$$

$$x = 8$$

The number xy is 84.

Answer: 84

Problem 14) The sum of the digits in a two-digit number is three. If the digits of the number are reversed, the new number is nine less than the original number. What is the original number?

Solution:

Let the two digit number be xy. Then, the reversed digits number is yx.

From the problem, we know that $x + y = 3$.

Then, we can write an equation equating the digits of the two numbers:

$$10x + y - (10y + x) = 9$$

$$10x + y - 10y - x = 9$$

$$9x - 9y = 9$$

This equation can be simplified to become

$$x - y = 1$$

$$x = y + 1$$

Isolate y so we have $y = x - 1$. Substitute this expression into the first equation above and solve for x:

$$(y + 1) + y = 3$$

$$2y + 1 = 3$$

$$2y = 2$$

$$y = 1$$

Use $y = 1$ in the first equation to find x:

$$x + 1 = 3$$

$$y = 2$$

The number xy is 21.

Answer: 21

Problem 15) The sum of the digits in a two-digit number is fifteen. If the tens digit is one more than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that

$$x + y = 15$$

$$x = y + 1.$$

Substitute $y + 1$ for x in the first equation and solve for y:

$$(y + 1) + y = 15$$

$$2y + 1 = 15$$

$$2y = 14$$

$$y = 7$$

Use $y = 7$ in the first equation and solve for x:

$$x + 7 = 15$$

$$x = 8$$

The number xy is 87.

Answer: 87

Problem 16) In a three-digit number, the hundreds digit is two less than the tens digit. The ones digit is six more than the tens digit. If the sum of the digits is thirteen, find the number.

Solution:

Let the three digit number be xyz. From the problem, we can write the following equations:

$$x + y + z = 13$$

$$x = y - 2$$

$$z = y + 6$$

Substituting from these equations into the first equation we have:

$$(y - 2) + y + (y + 6) = 13$$

$$3y + 4 = 13$$

$$3y = 9$$

$$y = 3$$

Use $y = 3$ to find x and z:

$$x = y - 2 = 3 - 2 = 1$$

$$z = y + 6 = 3 + 6 = 9$$

The number xyz is 139.

Answer: 139

Problem 17) The sum of the digits in a two-digit number is six. If the tens digit is two more than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that

$$x + y = 6$$

$$x = y + 2.$$

Substitute $y + 2$ for x in the first equation and solve for y:

$$(y + 2) + y = 6$$

$$2y + 2 = 6$$

$$2y = 4$$

$$y = 2$$

Use $y = 2$ in the first equation and solve for x:

$$x + 2 = 6$$

$$x = 4$$

The number xy is 42.

Answer: 42

Problem 18) The sum of the digits in a two-digit number is nine. If the tens digit is five more than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that

$$x + y = 9$$

$$x = y + 5.$$

Substitute $y + 5$ for x in the first equation and solve for y:

$$(y + 5) + y = 9$$

$$2y + 5 = 9$$

$$2y = 4$$

$$y = 2$$

Use $y = 2$ in the first equation and solve for x:

$$x + 2 = 9$$

$$x = 7$$

The number xy is 72.

Answer: 72

Problem 19) The sum of the digits in a two-digit number is eleven. If the tens digit is three less than the ones digit, find the number.

Solution:

Let the two digit number be xy. We know that

$$x + y = 11$$

$$x = y - 3.$$

Substitute $y - 3$ into the first equation for x and solve for y:

$$(y - 3) + y = 11$$

$$2y - 3 = 11$$

$$2y = 14$$

$$y = 7$$

Substitute $y = 7$ for x in the equation $x + y = 11$:

$$x + 7 = 11$$

$$x = 4$$

The number xy is 47.

Answer: 74

Problem 20) In a three-digit number, the hundreds digit is two more than the tens digit. The ones digit is two less than the tens digit. If the sum of the digits is twenty-one, find the number.

Solution:

Let the three digit number be xyz. From the problem, we can write the following equations:

$$x + y + z = 21$$

$$x = y + 2$$

$$z = y - 2$$

We can substitute the information from the last three equations into the first equation and we have:

$$(y + 2) + y + (y - 2) = 21$$

$$3y = 21$$

$$y = 7$$

Use $y = 7$ and solve for x and z:

$$x = y + 2 = 7 + 2 = 9$$

$$z = y - 2 = 7 - 2 = 5$$

The number xyz is 975.

Answer: 975