Math 2 Classwork 16

Warm Up

1 Compare:

$28 - 5 \square 28 - (5 + 1)$ $\quad$ $28 + 5 \square 28 + (5 + 1)$

$28 - 5 \square 28 - (5 - 2)$ $\quad$ $28 + 5 \square 28 + (5 - 1)$

$28 - 5 \square 28 - (5 + a)$ $\quad$ $28 + 5 \square 28 + (5 + a)$

$28 - 5 \square 28 - (5 - b)$ $\quad$ $28 + 5 \square 28 + (5 - b)$

2 Remove parentheses:

$10 + (2 + 8) =$ $\quad$ $74 - (15 + 5) =$

$10 + (10 + a) =$ $\quad$ $45 - (10 + h) =$

$28 + (15 - 5) =$ $\quad$ $40 - (15 - 5) =$

$23 + (b + 6) =$ $\quad$ $d - (16 - 4) =$

3 Write down algebraic expressions:

a) A dress costs $\$\boldsymbol{a}$, and a suit costs $\$\boldsymbol{b}$. How much do the dress and the suit cost together? _____

b) A dress costs $\$\boldsymbol{a}$, and a suit costs $\$\boldsymbol{b}$. How much more expensive is a suit than a dress?_____

c) A dress costs $\$\boldsymbol{a}$, which is $\$\boldsymbol{c}$ cheaper than a suit. How much does the suit cost? _____

4 Rewrite additions using multiplication:

$9 + 9 + 9 + 9 + 9 + 9 =$ ____ × ____ $\quad$ $\underbrace{3 + 3 + \ldots + 3}_{10 \text{ times}} =$ ____ × ____

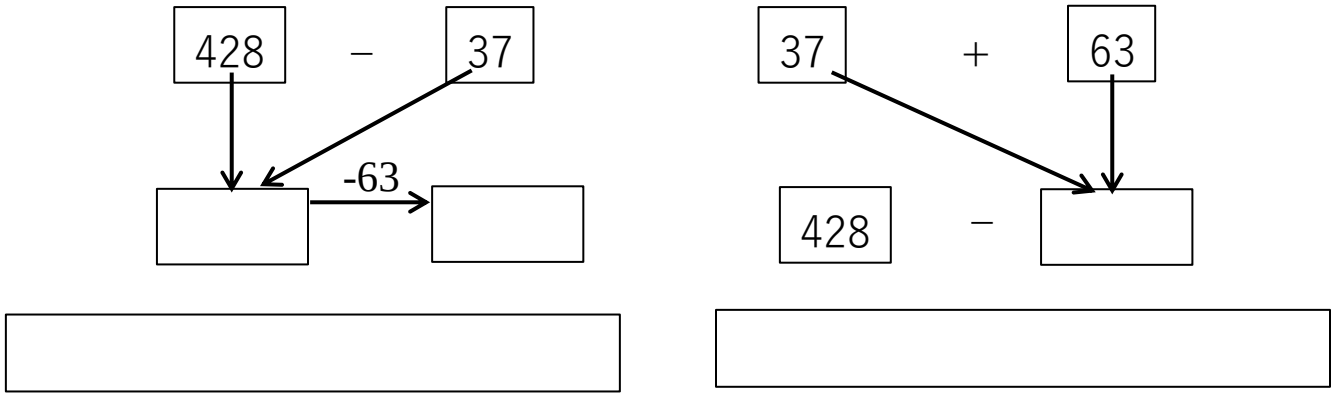
$\boldsymbol{c + c + c + c + c + c} =$ ____ × ____ $\quad$ $\underbrace{\boldsymbol{a + a + \ldots + a}}_{7 \text{ times}} =$ ____ × ____

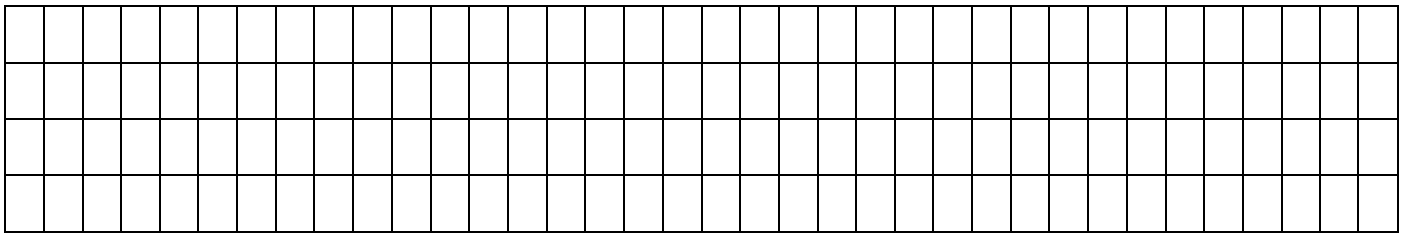
$\underbrace{5 + 5 + 5 \ldots + 5 + 5}_{\boldsymbol{n} \text{ times}} =$ ____ × ____ $\quad$ $\underbrace{\boldsymbol{k + k + \ldots + k}}_{\boldsymbol{m} \text{ times}} =$ ____ × ____

Homework Review

Write a correct expression in each case. Calculate the value of both expressions.

5





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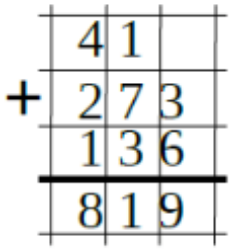
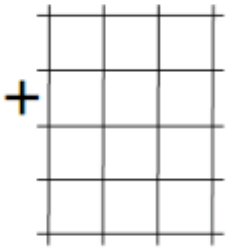
Tom was supposed to add together three numbers - 41, 273 and 136. He wrote them in column and added as shown. What did he do wrong? Help him add the numbers correctly.





New Material I

Multiplication is a mathematical operation where a number is added to itself a number of times. When we count point by grouping, we multiply them.

To express multiplication, we write: 5 × _____= _____

The values you are multiplying are called the **factors.** The answer in a multiplication problem is called the **product.** You find the product when you multiply two or any number of factors. There are a lot of symbols used in multiplication. Your basic work will use an "×" (×). It is called a "times" symbol.

We read the ***absence*** of a written operator to indicate multiplication:

ab means a × b

3(a + b) means 3 × (a + b)

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Let's consider multiplying the number 2 by the numbers from 1 to 10:

$2 \times 1 = 2$ (one set of two is equal to two: 2 = 2)
$2 \times 2 = 4$ (two sets of two equals four: 2 + 2 = 4)
$2 \times 3 = 6$ (three sets of two equals six: 2 + 2 + 2 = 6)
$2 \times 4 = 8$ (four sets of two equals eight: 2 + 2 + 2 + 2 = 8)
$2 \times 5 = 10$ (five sets of two equals ten: 2 + 2 + 2 + 2 + 2 = 10)
$2 \times 6 = 12$ (2 + 2 + 2 + 2 + 2 + 2 = 12)
$2 \times 7 = 14$ (2 + 2 + 2 + 2 + 2 + 2 + 2 = 14)
$2 \times 8 = 16$ (2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 16)
$2 \times 9 = 18$ (2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 18)
$2 \times 10 = 20$ (2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 20)

Do you see the **patterns**? _____
Do you see the way multiplication makes it easier to write the numbers in a math problem? When it comes down to it, doing all of that addition (over and over) is a waste of time. Let's use a multiplication instead!

Multiplication Table

The numbers on the top and left side of the grid are the two numbers you need to **multiply**. Your answer (product) is in the grid where the two lines intersect.

8

The table below shows all the products of pairs of numbers between 1 and 9.

a) Find the result (product) of multiplications numbers 1 to 9 by 2. Color all boxes with multiples of 2 in the multiplication table. What pattern do you see in the colored boxes?

b) What is the product of 2×8? _____
What is the product of 8×2 ? _____

c) $4 \times 2 =$ $6 \times 2 =$
$9 \times 2 =$ $2 \times 4 =$
$2 \times 6 =$ $2 \times 9 =$

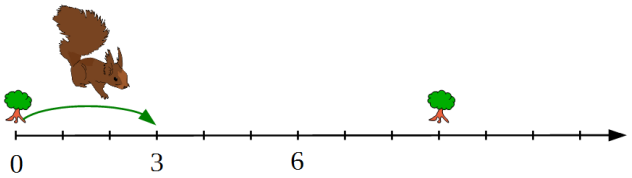
×	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

9 Calculate the number of triangles.

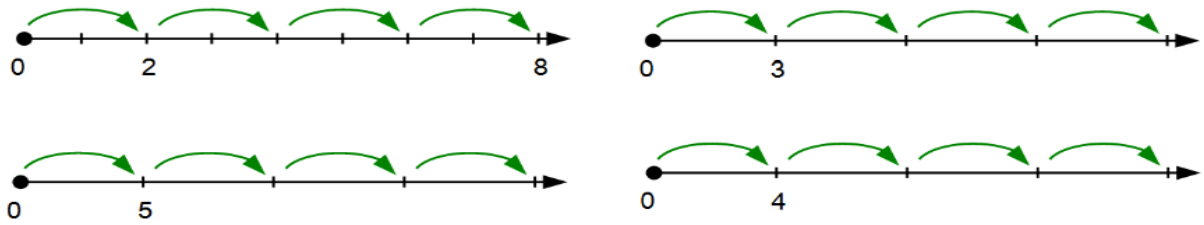
Objects in rectangular arrays

If we have triangles arranged in 2 rows and 5 columns, we can get the total number of triangles in two ways:
a) By rows:
(5 triangles in each row) x (2 rows) = **5 × 2 = 10** triangles
b) By columns:
(2 triangles in each column) x (5 columns) = **2 × 5 = 10** triangles
The answer will be the same, no matter which way we use.

10 On the ground, a squirrel can jump 3 feet at once. How far can it move in 4 jumps? _____
Find two trees on the number line. How far is one tree from another? ____
How many jumps does the squirrel need to do to get **from one tree to another? ____**



11 **Skip Counting.** Skip count by 2, by 3, by 4 and by 5 (make 4 jumps for each number)



What would be the end point for each skip counting? How can you write it down using multiplication?

REVIEW

The rules for removing parentheses

Parentheses will be preceded either by **a plus sign +:** $a + (b - c + d)$ or **a minus sign −:** $a - (b - c + d)$.

When parentheses are preceded by a plus sign + simply remove them. Nothing changes.

$$a + (b - c + d) = a + b - c + d.$$

When parentheses are preceded by a minus sign − change the sign of every term within the parentheses. Change + to − and − to + . $a - (b - c + d) = a - b + c - d.$

The sign of *b* within the parentheses is understood to be + . Therefore, upon removing the parentheses, that term becomes $(-b)$, $(-c)$ becomes $(+c)$, and $(+d)$ becomes $(-d)$.

In other words: *To subtract a* sum, *subtract each term of the sum*.

$$a - (b - c + d) = a - b + c - d.$$

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Remove parentheses and simplify (find the like terms) where possible

p + (q − r + s) = _____

p − (q − r + s) = _____

(x– 2) + (y + 8) = _____

(x – 2) + (y – 8) = _____

13

Using a ruler, draw 6cm long line segment $\overline{AB}$.

a) Find a middle point of the segment and name it by letter O.

b) Draw a straight line $\overleftrightarrow{CD}$which will intersect line segment $\overline{AB}$ under a right angle (use a right angle template or triangle ruler). Name all angles you got.

c) Find rays $\overrightarrow{OC}$and $\overrightarrow{OD}$

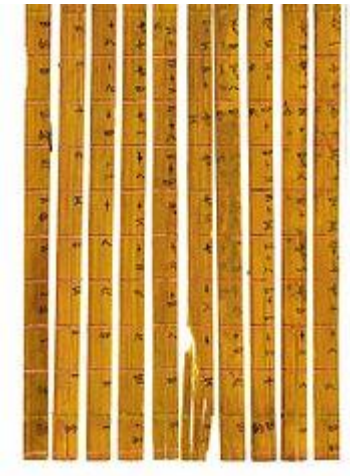
Remember the differences between straight line, line segment and ray.

Did you know …

In mathematics, a **multiplication table** (sometimes, less formally, a **times table**) is a table used to define results of multiplication operations.

The decimal multiplication table was traditionally taught as an essential part of elementary arithmetic around the world, as it lays the foundation for arithmetic operations with base-ten numbers.

Many educators believe it is necessary to memorize the table up to 9 × 9.



The oldest known multiplication tables were used by the Babylonians about 4000 years ago. However, they used a base of 60. The oldest known tables using a base of 10 are the Chinese decimal multiplication table on bamboo strips dating to about 305 BC, during China's Warring States period.

The multiplication table is sometimes attributed to the ancient Greek mathematician Pythagoras (570-495 BC). It is also called the Table of Pythagoras in many languages (for example French, Italian and at one point even Russian), and sometimes in English as well.