

Homework Review

5

Rewrite the expressions below using a multiplication. Think carefully.

a) $2 + 2 + 2 + 2 + 2 + 5 =$ _____

b) $5 + 5 + 5 + 5 + 4 =$ _____

c) $3 + 3 + 3 + 3 + 3 + 3 + 6 =$ _____

d) $7 + 7 + 7 + 3 =$ _____

6

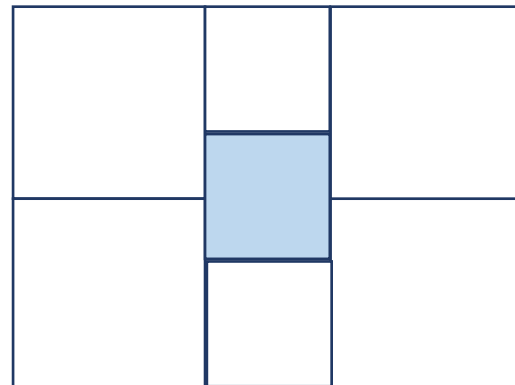
The rectangle below is divided on 7 squares. Find a perimeter of the rectangle if the side of shaded square is 2cm.

Find the length and width of the rectangle first.

Length = _____

Width = _____

Perimeter = _____

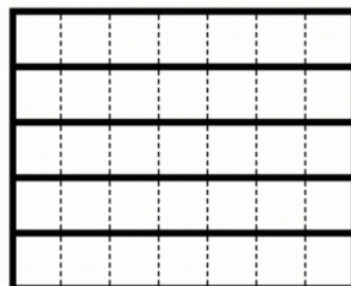
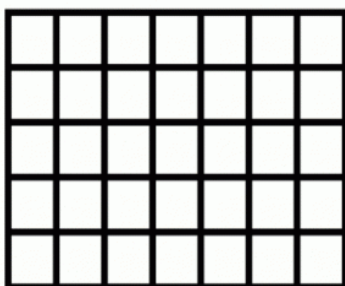


New Material I

The “equal groups” (arrays) thinking about multiplication.

The equal groups are a way of thinking, whereas repeated addition is a way of doing.

Example: $5 \times 7 = 7 \times 5 = 7 + 7 + 7 + 7 + 7 = 5 + 5 + 5 + 5 + 5 + 5 + 5$



Thus 5 groups of 7 is 7 groups of 5, so $5 \times 7 = 7 \times 5$.

Lesson 17 Multiplication by 0 and 1. Patterns in Multiplication table. Branching A.

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a) Perform the following actions and write their results:

$1 \times 2 = \underline{\hspace{2cm}}$

$1 \times 3 = \underline{\hspace{2cm}}$

$1 \times 6 = \underline{\hspace{2cm}}$

Conclusion: $1 \times a = \underline{\hspace{2cm}}$

or one group of a equals a

b) Perform the following actions and write their results:

$0 \times 2 = \underline{\hspace{2cm}}$

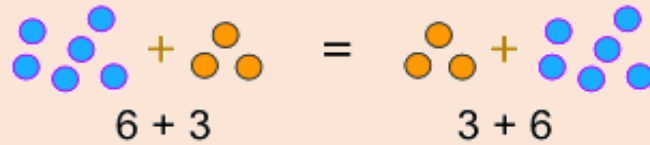
$0 \times 3 = \underline{\hspace{2cm}}$

$0 \times 6 = \underline{\hspace{2cm}}$

Conclusion: $0 \times a = \underline{\hspace{2cm}}$

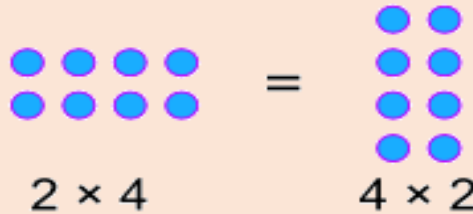
or zero group of a equals 0

The **Commutative property** of addition says changing the order of the numbers we are adding, does not change the sum.



Remember, when we add:

The **Commutative property** of multiplication says that the order in which we multiply numbers does not change the product.



When we **multiply**: $a \times b = b \times a$

8.

a) Use the commutative property of multiplication to evaluate the expressions:

$3 \times 1 = 1 \times 3 = \underline{\hspace{2cm}}$

$5 \times 1 = 1 \times 5 = \underline{\hspace{2cm}}$

$7 \times 1 = \times = \underline{\hspace{2cm}}$

$9 \times 1 = \times = \underline{\hspace{2cm}}$

Conclusion: $a \times 1 = \underline{\hspace{2cm}}$

or a groups of one equals a .

b) Use the commutative property of multiplication to evaluate the expressions:

$3 \times 0 = 0 \times 3 = \underline{\hspace{2cm}}$

$5 \times 0 = 0 \times 5 = \underline{\hspace{2cm}}$

$7 \times 0 = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$

Conclusion: $a \times 0 = \underline{\hspace{2cm}}$

or a groups of zeros equals 0 .

Patterns in Multiplication Table.

Pattern in math is an ordered set of numbers, shapes, or other mathematical objects, arranged according to a rule.

9.

Q1: Find all multiples of 2 in the multiplication table. What do those numbers have in the ones Place? _____

Q2: Find all multiples of 4 in the multiplication table. What do those numbers have in the ones place? _____ Is there any connection to the multiples of 2?

Q3: Find all multiples of 5 in the multiplication table. What do those numbers have in the ones place? _____. What is the pattern in the tens place? _____

Q4: Look at the darker shaded section of the multiplication table (right of the diagonal) and on the lighter shaded section (left of the diagonal). What do you notice? Can the multiplication table be drawn in the form of the triangle?

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

10.

Skip count by 20s from 0 up to 200 _____

Skip count by 30s from 0 up to 300 _____

Skip count by 50s from 0 up to 500 _____

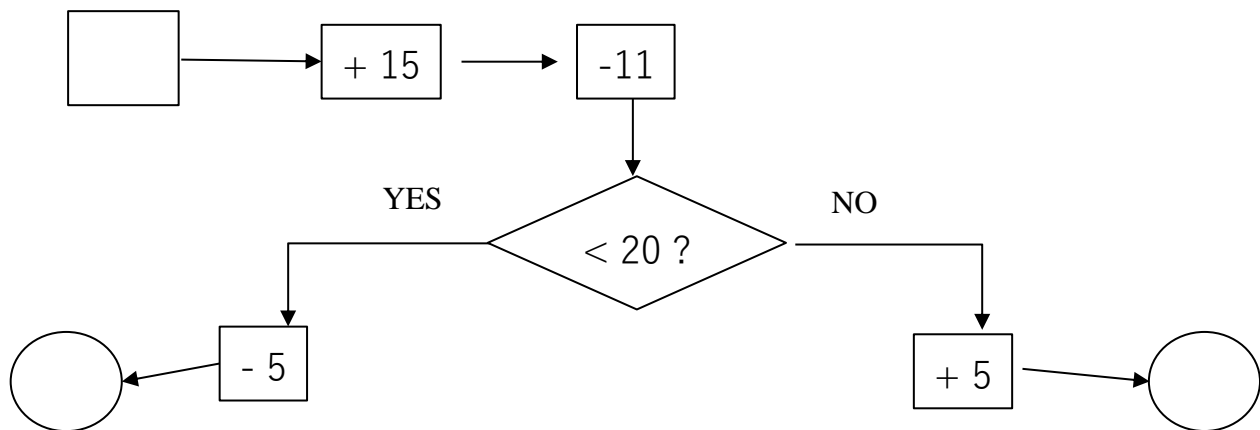
New Material II

Three important characteristics of the algorithm:

- It should be **finite**: If your algorithm never ends when you try to solve a problem, then it is useless
- It should have well **defined instructions**: Each step of the algorithm has to be precisely defined; **the** instructions should be unambiguously specified for each case.
- It should be **effective**: The algorithm should solve the problem it was designed to solve in the most optimal way.

Branching Algorithms

- 11** In a 1st box write any number between 10 and 20 in the square. Then, do the calculations according to the algorithm.

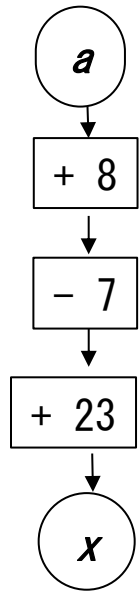


Number	10	11	12	13	14	15	16	17	18	19	20
Answer											

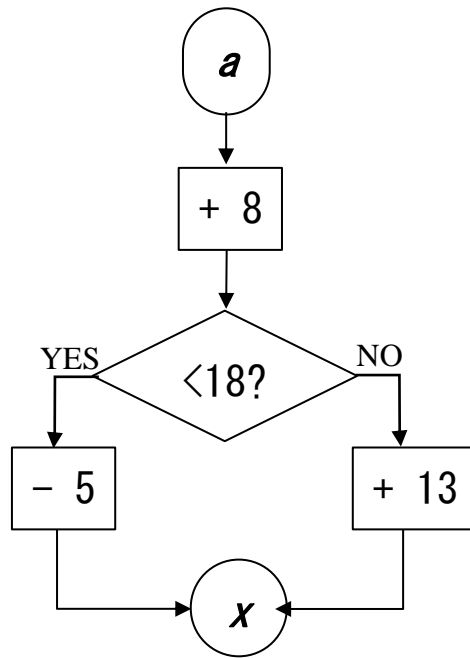
Lesson 17 Multiplication by 0 and 1. Patterns in Multiplication table. Branching A.

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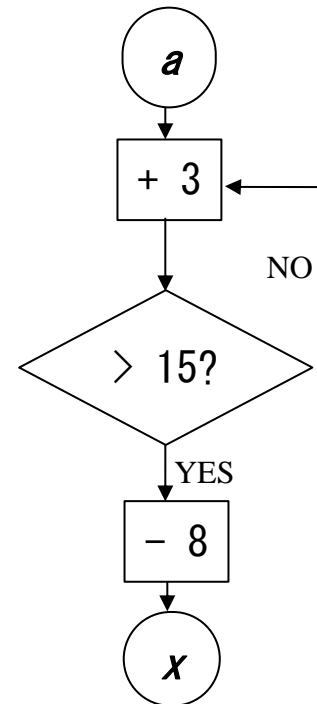
Which of those algorithms are *linear*, or *branching*, or *cyclic*? Find the value of x for every a by following each algorithm.



a	3	9	15
x			



a	3	9	15
x			



a	3	9	15
x			

Did you Know ...?

Multiplication table – rows with patterns –
multiplying by 5's and 9's

1. Let's start with the multiplication by 5's.

The first 10 multiples of 5 are: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

The pattern is obvious: All even numbers end in zero: 10, 20, 30, 40, ...

It makes sense since every two 5's gives us another 10. All odd numbers, which are multiplying by 5's, end in five. Use those two rules to count quickly:

$$4 \times 15 = 60$$

$$2 \times 125 = 250$$

$$21 \times 5 = 55$$

2. The pattern in the multiplication by 9's is even simpler!

Read the first ten multiples of 9: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90 aloud.

For the one's place, we see that 9 has 9 ones, 18 has 8 ones, and going through the list, we get that the values on one's place are 9, 8, 7, 6, 5, 4, 3, 2, 1, 0.

The tens place starts at 0 and goes up by one while the one's place is 9 again and goes down by 1: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

The first digit of the product is one less than the number you are multiplying by, and the second is whatever you need to make the two digits add up to 9.

For example: $9 \times 4 = 36$. It fits the pattern because 3 is one less than 4, and you need 6 to be added to 3 to make a sum of both numbers equal 9.

$$9 \times 6 = 54 \quad 9 \times 9 = 81 \quad 9 \times 7 = 63$$

3. There is a finger trick as well, which is very useful. To multiply 9×6 , you should put the sixth finger down and look at your hands. You will have 5 fingers up on one side of the down finger and 4 on the other.

