

Math 365 Lecture Notes Section 2.4 – Multiplication and Division of Whole Numbers

★ Situations That Involve Multiplication

1) Repeated Addition

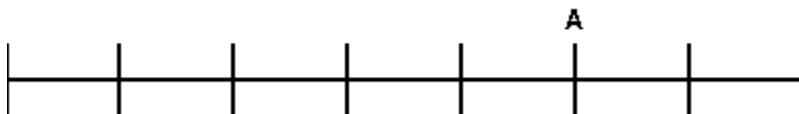
Collection of Objects: Mary has 3 balloons, Tom has 3 balloons, Gary has 3 balloons, Kathryn has 3 balloons, and Jerome has 3 balloons. How many balloons do they have all together?



Colored Rods: If you have a brick wall that has 14 bricks in each layer, and the wall is 23 layers deep, how many bricks does it take to make the wall?

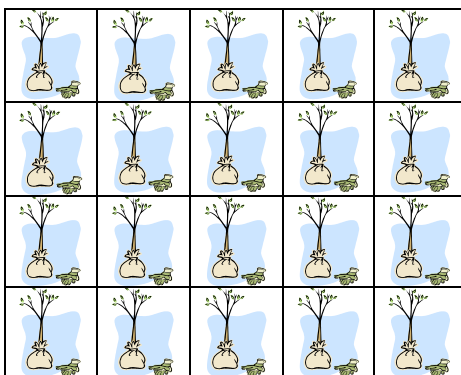


Number Line: What is the sum of $5+5+5+5+5$?



2) Array and Area Models

Li has planted 4 rows of 5 tomato plants in her garden. How many tomato plants were planted in her garden?



3) Cartesian-Product Model

You are making ice cream sundaes for a birthday party. If you have chocolate, vanilla, or strawberry ice cream to choose from, and you can top the ice cream with hot fudge, caramel, butterscotch, or mixed fruit, how many different ice cream sundaes can you make?

The Operation of Multiplication

Definition:

1)

2)

★ Properties of Multiplication

Closure Property:

Commutative Property:

Associative Property:

Identity Property:

Zero Multiplication Property:

Distributive Property:

Modeling the Distributive Property: Sarah rolls 2 yards of blue ribbon and 3 yards of red ribbon on a wooden spool. If she does this with 4 wooden spools, how many yards of ribbon has she used?

★ Situations That Involve Division

1) Set (Partition) Model

2) **Missing Factor Model**

3) **Repeated Subtraction Model**

4) **Array**

5) **Area**

★ **The Operation of Division**

1) Definition:

2) The Division Algorithm:

Problem 1: Which of the following are true? If the equation is false, state why.

a) $6 \div 2 = 3$

d) $0 \div 0 = 0$

b) $6 \div 0 = 0$

e) $0 \div 0 = 1$

c) $0 \div 8 = 0$

Problem 2:

a) If 78 is divided by a number and the remainder is 8, what are the possible divisors?

b) Twenty-five apples are divided among a group of boys in such a way that 5 apples are left over. Find all possible values for the number of boys and the number of apples each boy received. Explain how you arrived at your answer.

★ **The Order of Operations**

When computing an expression, the operations must be performed in the following order:

1st

2nd

3rd

4th

Problem 3: In the expression $16 - (2 + 2)^2 \div 8 \bullet 5$, what computation must be done last?

Problem 4: the operation $*$ is defined on the set $\{a,b,c,d,e\}$ in the table below.

For example, $a*b = c$. Complete the table below so that the operation $*$ is closed, commutative, and d is the identity element.

*	a	b	c	d	e
a	b	c			
b		e			
c	e		a		b
d					
e					c