Lesson #2: Sections 1.1 & 1.2

By the end of the lesson, you will be able to:

~ Solve problems using order of operations
~ Classify numbers into sets of numbers
~ Find products using the distributive property

Order of Operations

1st: Simplify the expressions inside grouping symbols

ex: grouping symbols ( ) [ ] ——

2nd: Evaluate all powers

ex: "What are powers"? exponents

3^2

3rd: Do all multiplications & divisions from left to right

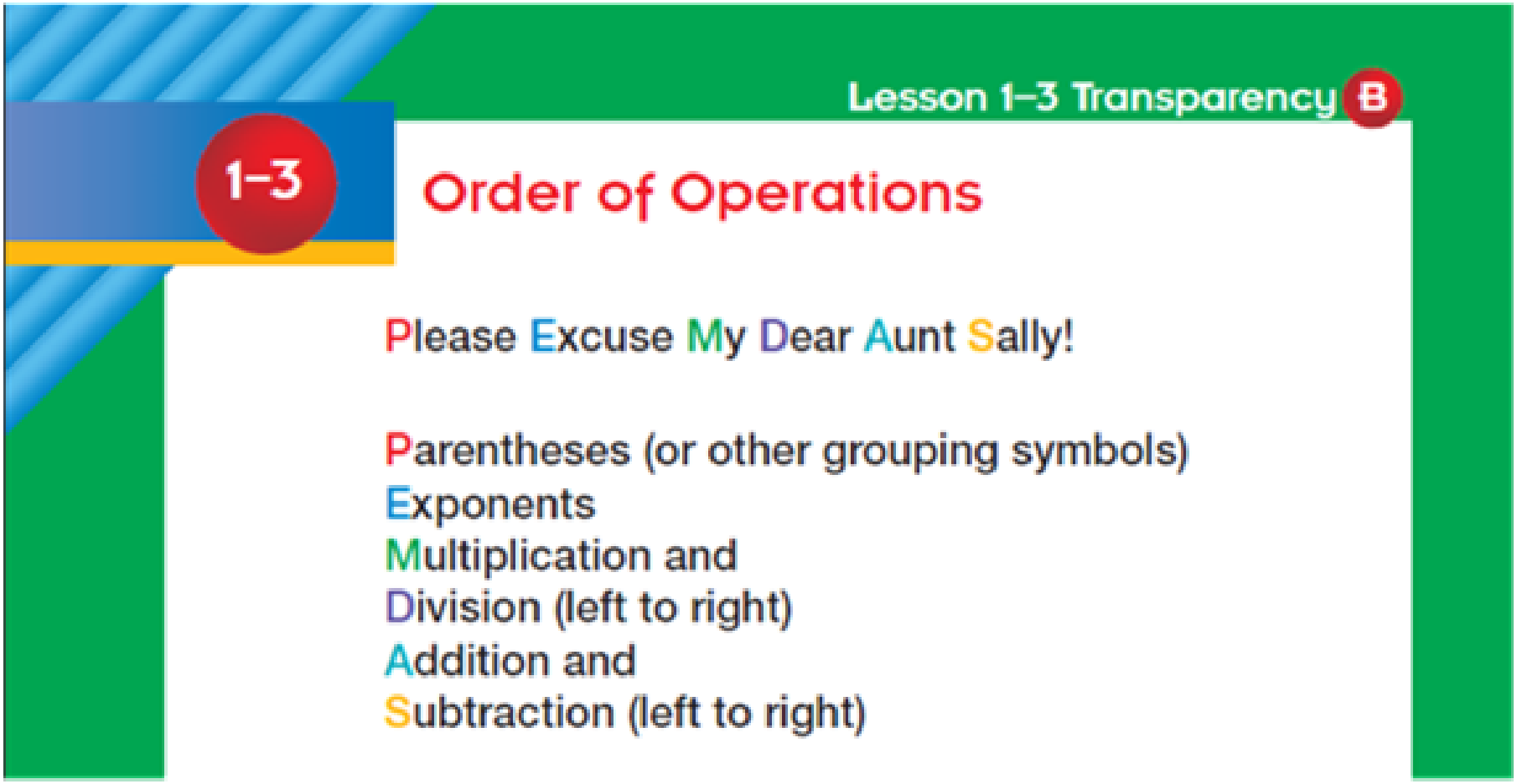
ex: $4(3)$ $12 \div 4$

4th: Do all additions & subtractions from left to right

ex: $5+6$ $-3-11$

Order of Operations

Or an easier way to remember the rules of order of operations:



Lesson #2: Sections 1.1 & 1.2

Please Excuse My Dear Aunt Sally!

Parentheses (or other grouping symbols)
Exponents
Multiplication and
Division (left to right)
Addition and
Subtraction (left to right)

Example 1:

Evaluate $8 + 3 \cdot 5^2 - (18 - 8) \div 5$.

$= 8 + 3 \cdot 5^2 - 10 \div 5$

$= 8 + 3 \cdot 25 - 10 \div 5$

$= 8 + 75 - 2$

$= 83 - 2$

$= \boxed{81}$

$$\begin{array}{r} 75 \\ +\ 8 \\ \hline 83 \end{array}$$

Lesson #2: Sections 1.1 & 1.2

Please Excuse My Dear Aunt Sally!

Parentheses (or other grouping symbols)
Exponents
Multiplication and
Division (left to right)
Addition and
Subtraction (left to right)

Example 2:

Evaluate: $20 \div 4 \cdot 5 \cdot 2 \div 10$

$= 5 \cdot 5 \cdot 2 \div 10$

$= 25 \cdot 2 \div 10$

$= 50 \div 10$

$= \boxed{5}$

Example 3:

Evaluate: $\dfrac{6^2 - 4^2}{2(3 - 2)} - 2^3$

$= \dfrac{36 - 16}{2(1)} - 8$

$= \dfrac{20}{2} - 8$

$= 10 - 8$

$= \boxed{2}$

Using substitution for variables

Example 1: **Evaluate each expression when $v = 5$, $x = 3$, $a = 7$, and $b = 5$.**

$$v^2 - (x^3 - 4b)$$

$= 5^2 - (3^3 - 4 \cdot 5)$

$= 5^2 - (27 - 4 \cdot 5)$

$= 5^2 - (27 - 20)$

$= 5^2 - 7$

$= 25 - 7$

$= \boxed{18}$

Using substitution for variables

Example 2: **Evaluate each expression when $v = 5$, $x = 3$, $a = 7$, and $b = 5$.**

$$(2v)^2 + ab - 3x$$

$= (2 \cdot 5)^2 + 7 \cdot 5 - 3 \cdot 3$

$= (10)^2 + 7 \cdot 5 - 3 \cdot 3$

$= 100 + 7 \cdot 5 - 3 \cdot 3$

$= 100 + 35 - 9$

$= 135 - 9$

$= \boxed{126}$

$= 126$

Number Sets!

Natural Numbers- Symbol: $\mathbb{N}$

Are counting numbers (positive numbers)

ex: 1, 2, 3, 4, ...

Whole Numbers- Symbol: ω

Are all of the natural numbers including 0.

[remember whole #'s have a "hole" (0) in it]

ex: 0, 1, 2, 3, 4, ...

Lesson #2: Sections 1.1 & 1.2

Integers- Symbol: $\mathbb{Z}$

Are the whole numbers plus with the negative numbers

ex:

$\ldots -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, \ldots$

Rational Numbers- Symbol: $\mathbb{Q}$

Can be expressed as a ratio of two integers. *The decimal form of rational numbers are either a terminating or repeating decimal.*

ratio?: $\frac{a}{b}$, fraction

$-5\frac{7}{9}$ $3.767676\ldots$

ex: $\frac{1}{4}, .25, 1\frac{1}{3}, 1.\overline{3}$

0, 4, -5

Lesson #2: Sections 1.1 & 1.2

Irrational Numbers- Symbol: $\mathbb{I}$

Are any numbers that are NOT rational. Irrationals have decimals that go on forever.

ex: π , e , $3.798314\ldots$

$3.14\ldots$ $2.71\ldots$, $\sqrt{5}, \sqrt{7}, \sqrt{3}, \sqrt{13}, \sqrt{20}$

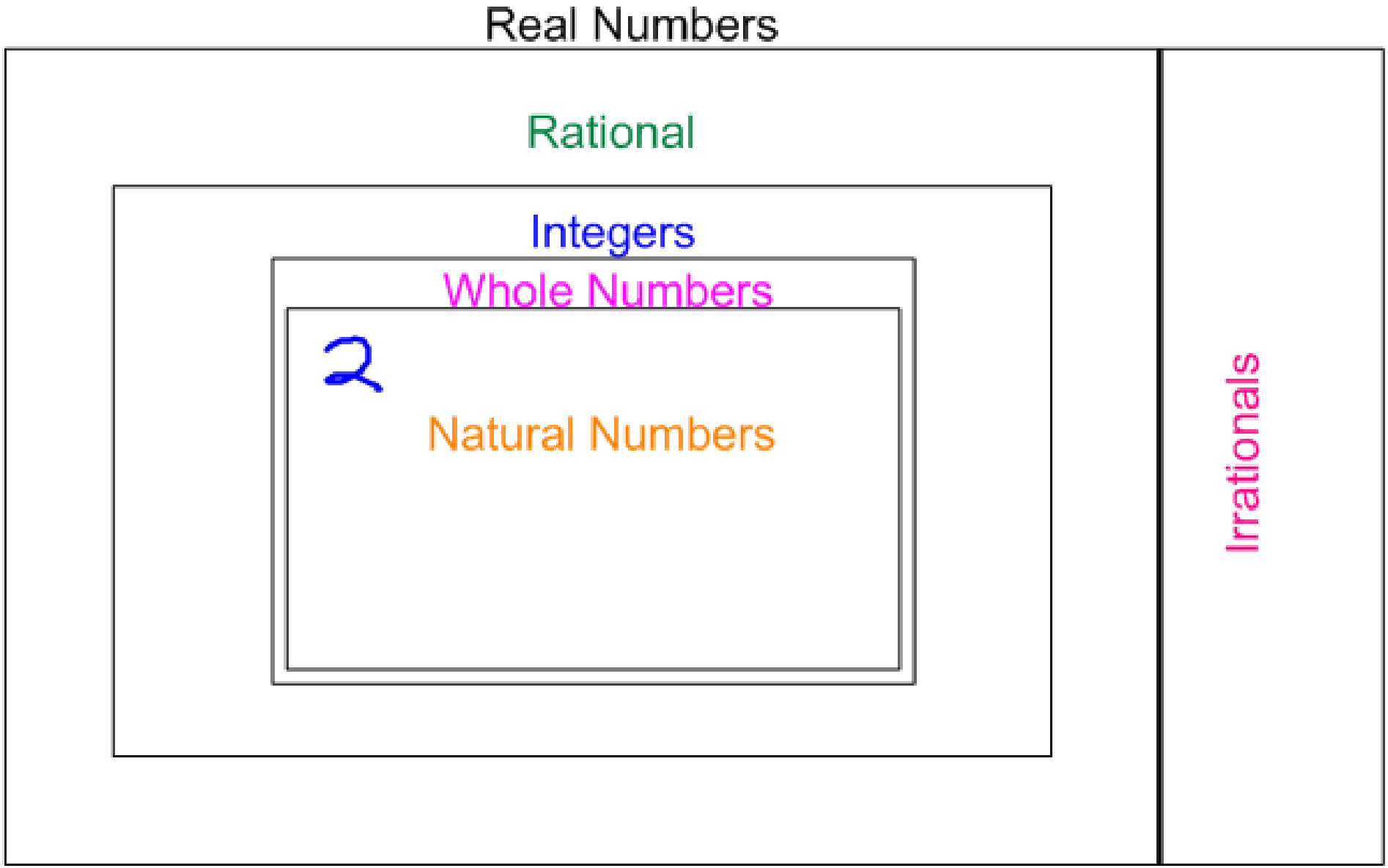
Real Numbers- Symbol: $\mathbb{R}$

Are all the numbers that you use in everyday life, they are rational and irrational numbers combined.

ex: $0, -3, \frac{5}{4}, \sqrt{3}, \pi$

Lesson #2: Sections 1.1 & 1.2

Classifying real numbers



Classifying real numbers

Name the ALL the sets of numbers that each belongs to

a.) 5 $\mathbb{N}, \mathbb{W}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$

b.) -32 $\mathbb{Z}, \mathbb{Q}, \mathbb{R}$

c.) 3/4 $\mathbb{Q}, \mathbb{R}$

d.) pi π $\mathbb{I}, \mathbb{R}$

Classifying real numbers

True or False? If false, give an example of why it is false.

a.) Every real number is irrational.

F, 2

b.) Every integer is a rational number.

T

c.) Every integer is a whole number.

F, -2

d.) Every whole number is an integer.

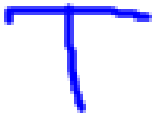
T

Classifying real numbers

True or False? If false, give an example of why it is false.

e.) Every irrational number is a real number.

f.) Every natural number is an integer.



g.) Every real number is either a rational number or an irrational number.

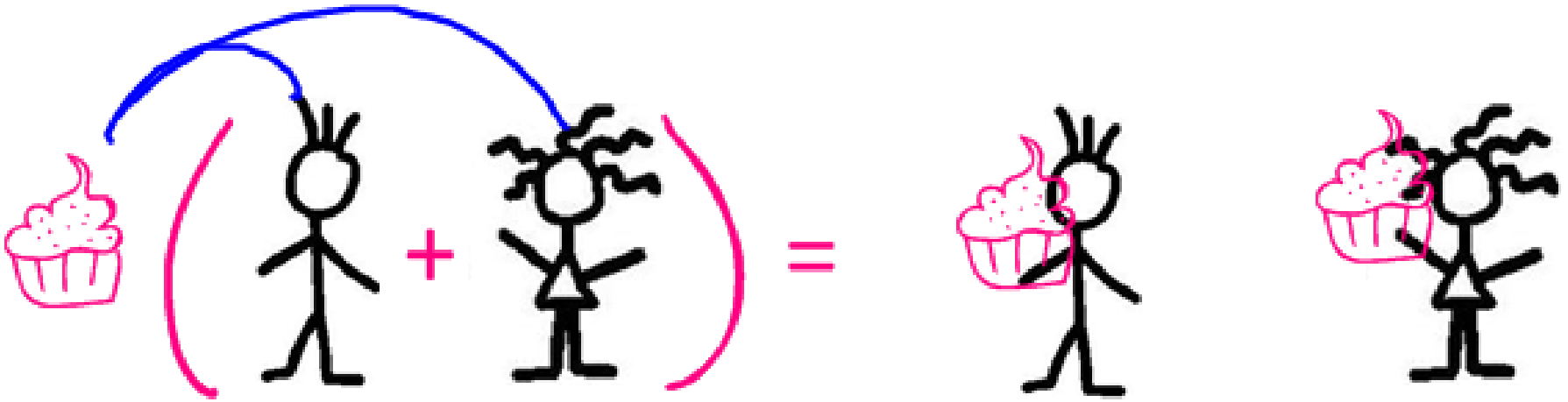
Distributive Property

What does DISTRIBUTE mean?

Spread out, give out to all

Distribute:

Distribute the cupcake.



This is the distributive property. We will be doing this to expressions with numbers and variables.

Find the product:

Use the distributive property.

$2x(y + 13) = 2xy + 26x$

Find the product for each:

Use the distributive property.

1. $7(6x + 5y + 2) = 42x + 35y + 14$

2. $2a^2(a - b) = 2a^3 - 2a^2b$

Find the product for each:

Use the distributive property.

3. $\frac{1}{2}(3a-2b)-\frac{3}{4}(4a+2b)$

$= \frac{1}{2}\cdot\frac{3a}{1} - \frac{1}{2}\cdot\frac{2b}{1} - \frac{3}{4}\cdot\frac{4a}{1} - \frac{3}{4}\cdot\frac{2b}{1}$

$= \frac{3}{2}a - b - 3a - \frac{3}{2}b$

$= \frac{3}{2}a - \frac{3\cdot 2}{1\cdot 2}a - \frac{1b}{12} - \frac{3}{2}b$

$= \frac{3}{2}a - \frac{6}{2}a - \frac{2}{2}b - \frac{3}{2}b = \boxed{-\frac{3}{2}a - \frac{5}{2}b}$

Find the product for each:

Use the distributive property.

4. $2(2a - b) + 6(3a + 4b)$

Lesson #2: Sections 1.1 & 1.2

By the end of the lesson, you will be able to:

~ Solve problems using order of operations
~ Classify numbers into sets of numbers
~ Find products using the distributive property

Can you?

Homework:

Assignment #2:

Remember to do the homework in the order it is written in the packet - write down the original problem!

Also, two columns at most.