

Warm UP (8min)

1. $3(x + 2)$

2. $8x - (2x - 4) - 3$

Evaluate these expressions when:

$X = 4$

$X = -2$

$X = 0$


$X = 1$

3. Name the subsets of the real numbers to which each number belongs:

1. -2.3248

2. $\sqrt{46}$

4. Is the following statement true or false? **If** the product of three numbers is negative **then** all the numbers are negative. If false, give a counterexample.



They don't think it be like it is, but it do.

Warm UP (8min)

$3(x + 2)$

for $x=4$

$3(4 + 2) = 3 \cdot (6) = 18$

for $x=-2$

$3(-2 + 2) = 3 \cdot (0) = 0$

$x=0$

$3(0 + 2) = 3 \cdot (2) = 6$

$x=1$

$3(1 + 2) = 3 \cdot (3) = 9$


Evaluate these expressions when:

$X = 4$

$X = -2$

$X = 0$

$X = 1$



They don't think it be like it is, but it do.

Warm UP (8min)

Evaluate these expressions when:

$X = 4$

$X = -2$

$X = 0$

$X = 1$

$$8x - (2x - 4) - 3$$

$$8 \cdot 4 - (2 \cdot 4 - 4) - 3$$

$$8 \cdot 4 - (2 \cdot 4 - 4) - 3$$

$$8 \cdot 4 - (8 - 4) - 3$$

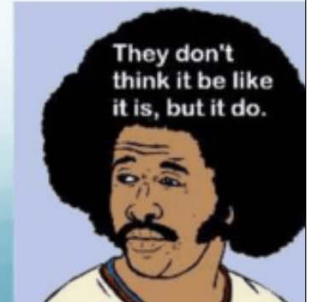
$$8 \cdot 4 - (4) - 3$$

$$32 - 4 - 3$$

$$28 - 3 = 25$$

Answer when $x=4$

They don't think it be like it is, but it do.



Warm UP (8min)

Evaluate these expressions when:

$X = 4$

$X = -2$

$X = 0$

$X = 1$

$$8x - (2x - 4) - 3$$

$$8 \cdot -2 - (2 \cdot -2 - 4) - 3$$

$$8 \cdot -2 - (-4 - 4) - 3$$

$$8 \cdot -2 - (-8) - 3$$

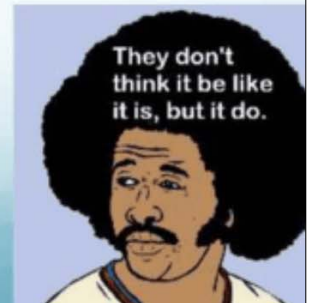
$$-16 - -8 - 3$$

$$-16 + 8 - 3$$

$$-16 + 5 = -11$$

Answer when $x=-2$

They don't think it be like it is, but it do.



Warm UP (8min)

$$8x - (2x - 4) - 3$$

$$8 \cdot 0 - (2 \cdot 0 - 4) - 3$$

$$8 \cdot 0 - (0 - 4) - 3$$

$$0 - (-4) - 3$$

$$0 - -4 - 3$$

$$+4 - 3 = 1$$

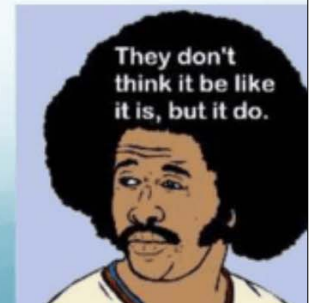
Evaluate these expressions when:

$$X = 4$$

$$X = -2$$

$$X = 0$$

$$X = 1$$



Warm UP (8min)

$$8x - (2x - 4) - 3$$

$$8 \cdot 1 - (2 \cdot 1 - 4) - 3$$

$$8 - (2 - 4) - 3$$

$$8 - (-2) - 3$$

$$8 - -2 - 3$$

$$8 + 2 - 3$$

$$10 - 3 = 7$$

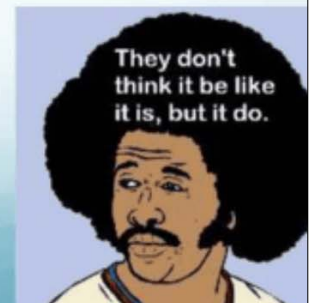
Evaluate these expressions when:

$$X = 4$$

$$X = -2$$

$$X = 0$$

$$X = 1$$



Warm UP (8min)

Name the subsets of the real numbers to which each number belongs:

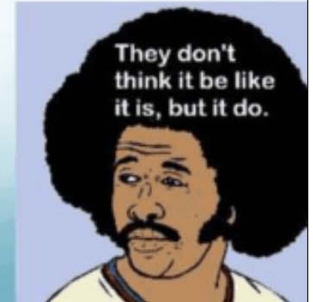
1. -2.3248

Real
Rational

Because all decimals are fractions.

2. $\sqrt{46}$

Real
Irrational



Warm UP (8min)

Is the following statement true or false? **If** the product of three numbers is negative **then** all the numbers are negative. If false, give a counterexample.

Multiplication

False

$\boxed{?} \cdot \boxed{?} \cdot \boxed{?} = \text{Negative \#}$

Test 3 negative #'s

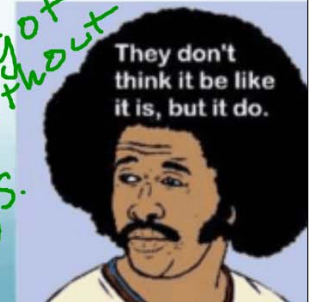
$\boxed{-2} \cdot \boxed{-1} \cdot \boxed{-4} = -8$

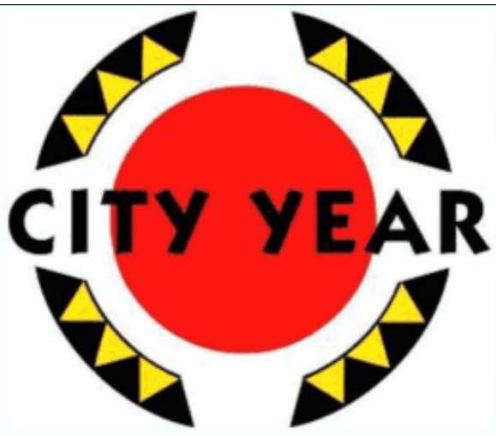
Test 1 neg and 2 pos #'s

$\boxed{-2} \cdot \boxed{1} \cdot \boxed{4} = -8$

this is neg... good but can we do it without 3 negs?

omg number 1 got a neg. Needing without 3 negs.





Come to RM
147 from
2:20 → 3:30 pm
for tutoring!



Vocab Catchup

Nothing New

Definition:	Illustration:
Examples:	Non-Examples:

The diagram shows a face with a large empty oval for a mouth. Blue arcs above the eyes and red arcs below the mouth suggest a smile. The face is divided into four quadrants by a horizontal line through the mouth and a vertical line through the nose. The quadrants are labeled: Definition: (top-left), Illustration: (top-right), Examples: (bottom-left), and Non-Examples: (bottom-right).

Unit 1: Numbers and Expressions

Day 7/9: Review and Exponents

u1d6 NOTES

MUST BE ORGANIZED FOR THE TEST

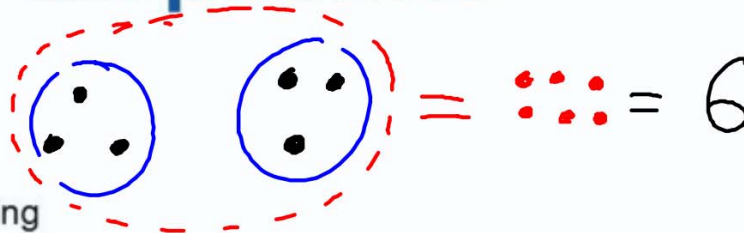
Index: 

UNIT 1

u1d1	Class Rules, What are Numbers	.....	Page 1
u1d2	Properties of Real Numbers and Number Types	.....	Page ____
u1d3	Quiz and Baseline Test	.....	Page ____
u1d4	PEMDAS and Algebraic Expressions	.....	Page ____
u1d5	Like Terms, Distribution	.....	Page ____
u1d6	Review and Exponents	.....	Page ____
u1d7	<i>Exponents</i>	.....	Page ____
u1d8		.....	Page ____
u1d9	TEST		

Ex²ponents

Review Adding
 $3 + 3 =$



Review Multiplying
 $3 \cdot 5 =$

Take 3 five times:

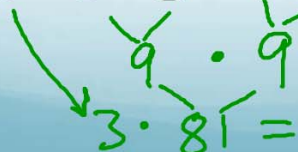
$$3 + 3 + 3 + 3 + 3 = 15$$

Explore Exponents
 $3^5 =$

Multiply 3 five times:

$$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 243$$

$$\begin{array}{r} 81 \\ 3 \\ \hline 243 \end{array}$$



$3 \cdot 81 =$

Exponents

What happens when you multiply two powers with the same base?

$$2^2 \cdot 2^3 = 2^2 \cdot 2^3 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 2^5 = 2^{(2+3)}$$

$$4^1 \cdot 4^5 = 4^1 \cdot 4^5 = 4^{(1+5)} = 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 = 4^6$$

$$x^2 \cdot x^6 = x^2 \cdot x^6 = x^{2+6} = x^8$$

$x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x = x^8$

Exponents

What happens when you multiply two powers with the same base?

Product of Powers Property



To multiply powers with the same base add their exponents.

Exponents

What happens when you divide two powers with the same base?

$$\frac{2^5}{2^3} = \frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot 2 \cdot 2}{\cancel{2} \cdot \cancel{2} \cdot \cancel{2}} = 2 \cdot 2 = 2^2 = 2^{(5-3)}$$

$$\frac{4^3}{4^2} = \frac{\cancel{4} \cdot \cancel{4} \cdot 4}{\cancel{4} \cdot \cancel{4}} = 4 = 4^{(3-2)} = 4^1$$

$$\frac{x^2}{x^6} = \frac{\cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = \frac{1}{x^4} = x^{(2-6)} = x^{-4}$$

Look

Exponents

What happens when you divide two powers with the same base?

Quotient of Powers Property



To divide powers with the same base, Subtract their exponents.

Exponents

What does a negative exponent mean?

$$2^{-3} = \frac{1}{2^3} = \frac{1}{2 \cdot 2 \cdot 2}$$

$$3^{-3} \cdot 3^4 = \underbrace{3^{-3}} \cdot 3^4 = \frac{3^4}{3^3} = \frac{\cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot 3}{\cancel{3} \cdot \cancel{3} \cdot \cancel{3}} = 3$$

or use the
Product Rule

$$3^{(-3 + 4)} = 3^1$$

The Same

Exponents

What does a negative exponent mean?

$$\frac{x^2}{x^{-3}} = \frac{x^2}{x^{-3}} = x \cdot x \cdot x \cdot x \cdot x = x^5$$

OR use the
Quotient Rule

$$x^{(2 - -3)} = x^{(2+3)} = x^5$$

UP Stairs

Down Stairs

Exponents

What does a negative exponent mean?

Negative Power Property



Negative exponents are never happy! They always want to switch "floors." So a negative exponent on the top floor wants to go down stairs. Like this:

$$x^{-2} = \frac{1}{x^2}$$

1 1

↑ ↑

Exponents

What does a zero exponent mean?

But Quotient Rule Says subtract the exponent

$$\frac{4^2}{4^2} = \frac{4 \cdot 4}{4 \cdot 4} = 1 \cdot 1 = 1$$

$$\frac{4^2}{4^2} = 4^{(2-2)} = 4^0$$

$$4^0 = 1$$

$$c^0 = 1$$

These must be equal!

Ex²ponents

What does a zero exponent mean?

Zero Power Property



Anything* that is raised
to the zero power is
simply one!

* zero raised to the zero is
Undefined!

Ex²ponents

$$2^8 = 2^{2 \cdot 4}$$

What happens when you take the power of a power?

$$(2^2)^4 = (2^2)^4 = 2^2 \cdot 2^2 \cdot 2^2 \cdot 2^2 = 2^{(2+2+2+2)} = 2^8$$

$$(4^3)^2 = (4^3)^2 = 4^3 \cdot 4^3 = 4^{(3+3)} = 4^6 = 4^{3 \cdot 2}$$

$$(x^5)^3 = x^{5 \cdot 3} = x^{15}$$

Exponents

What happens when you take the power of a power?

Power of a Power Property



To find the power of a power, multiply the exponents.

Exponents

What happens when you take the power of a product?

$$(2 \cdot 5)^2 = (2 \cdot 5) \cdot (2 \cdot 5) = 2^2 \cdot 5^2 = (2 \cdot 5)^2$$

The diagram shows the expansion of $(2 \cdot 5)^2$. The first step is $(2 \cdot 5) \cdot (2 \cdot 5)$, where the 2s are blue and 5s are pink. The second step is $2 \cdot 5 \cdot 2 \cdot 5$. The third step is $2 \cdot 2 \cdot 5 \cdot 5$. The final step is $2^2 \cdot 5^2$. An arrow points from $2^2 \cdot 5^2$ to $(2 \cdot 5)^2$. Orange arrows above the final expression show the 2 being applied to both 2 and 5.

$$(3x)^2 = (3 \cdot x)^2 = 3^2 \cdot x^2 = 9x^2$$

The diagram shows the expansion of $(3x)^2$. Orange arrows above the expression show the 2 being applied to both 3 and x.

Ex²ponents

What happens when you take the power of a product?

Power of a Product Property



To find a power of a product, distribute the exponent to all the terms inside.

Ex²ponents

1) $4^2 \cdot 4^2$

2) $4 \cdot 4^2$

3) $3^2 \cdot 3^2$

4) $2 \cdot 2^2 \cdot 2^2$

5) $2n^4 \cdot 5n^4$

6) $6r \cdot 5r^2$

7) $2n^4 \cdot 6n^4$

8) $6k^2 \cdot k$

9) $5b^2 \cdot 8b$

10) $4x^2 \cdot 3x$

