Warmup 1/(The <u>base</u> used in scientific notation)

Evaluate:

1) 7^3

2) $(-5)^4$

3) $\left(\frac{11}{9}\right)^2$

4) If we have time…

REMEMBER:

- The corrections/extension assignment is due Monday.
- Do a good job on this! Write specific explanations, not vague ones.

- Also 30 min ALEKS

A simple question...

- If you fold a piece of paper in half 7 times, how many layers are there?

- Try it!!!

We're starting a NEW table of contents...

- **You should keep your old TOC/old notes. But you could move them to the back section of your binder. These new notes should be in front.**

Table of Contents (2ⁿᵈ Semester)

Exponent Basics

Objective:

-Review how exponents work

-Look at powers of negative numbers

Remember…

- Anything in **RED** is something you **MUST** write down.

- Anything else is up to you. You should know your learning style best. Write down what you feel will be helpful to you.
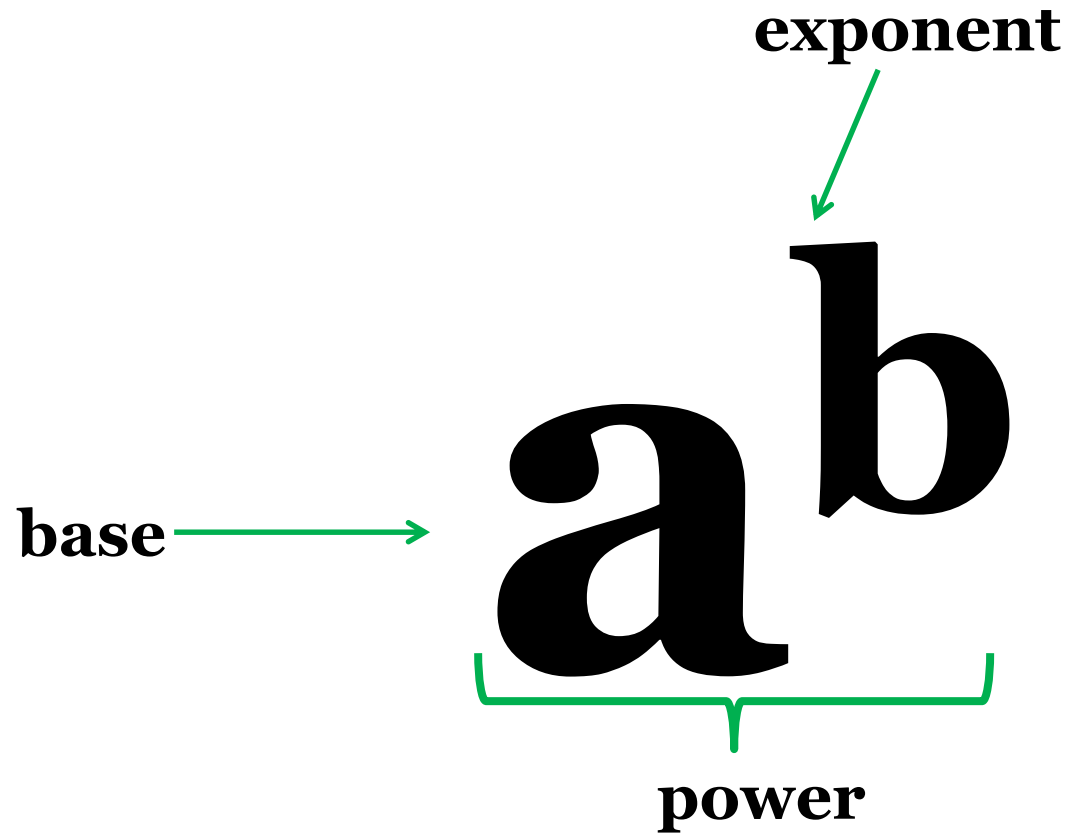
Also…

- Please do NOT work on the homework during the lesson.

Brainstorm with your trio: EVERYTHING you remember about exponents!

- How do they work? What are some related vocab words?

- Each group will have to share 1 thing they discussed. Have multiple things to share so you have a backup. Be creative!

Vocab

exponent

$$a^b$$

base

power

"squared" = to the 2nd power
"cubed" = to the 3rd power

What is the number "out in front" called?

$$7x^3$$

Coefficient

"Expanding"

- **Expand = write out all the factors**

- **Expanding will be VERY VERY VERY helpful later when we are learning more complicated rules.**

Expand and Simplify:
- 10^4

- $7x^5$

IMPORTANT

Expanding $7x^5$

- **RIGHT:** $7 \cdot x \cdot x \cdot x \cdot x \cdot x$
- **WRONG:** $7x \cdot 7x \cdot 7x \cdot 7x \cdot 7x$

- (The coefficient is NOT connected to the exponent!)

Example: Write using powers

8 • k • m • k • k • 8 • 8 • k • k

"Write using powers" = leave it with an exponent
"Evaluate" = actually work it out

Powers of 2

- $2^1 = 2$
- $2^2 = 4$
- $2^3 = 8$
- $2^4 = 16$
- $2^5 = 32$
- $2^6 = 64$
- $2^7 = 128$
- $2^8 = 256$
- $2^9 = 512$
- $2^{10} = 1024$
- $2^{11} = 2048$
- $2^{12} = 4096$
- $2^{13} = 8192$
- $2^{14} = 16384$
- $2^{15} = 32768$

Powers of 3

- $3^1 = 3$
- $3^2 = 9$
- $3^3 = 27$
- $3^4 = 81$
- $3^5 = 243$
- $3^6 = 729$
- $3^7 = 2187$

Powers of 4

- $4^1 = 4$
- $4^2 = 16$
- $4^3 = 64$
- $4^4 = 256$
- $4^5 = 1024$
- $4^6 = 4096$

Powers of 5

- $5^1 = 5$
- $5^2 = 25$
- $5^3 = 125$
- $5^4 = 625$
- $5^5 = 3125$

Negative bases

Powers of -2…

$(-2)^1 = -2$

$(-2)^2 = 4$

$(-2)^3 = -8$

$(-2)^4 = 16$

$(-2)^5 = -32$

$(-2)^6 = 64$

A negative number to an odd power is negative.
A negative number to an even power is positive.

This is the reason that you <u>can</u> do the cube root of a negative but you <u>can't</u> do a square roots of a negative!

Do we really need the parentheses?

$$(-3)^2 \quad \text{VS.} \quad -3^2$$

IF THERE ARE NO PARENTHESES, YOU EVALUATE THE POWER FIRST AND **THEN** MAKE IT NEGATIVE, BECAUSE THE NEGATIVE SIGN IS NOT CONNECTED TO THE EXPONENT.

OR BECAUSE: A NEGATIVE SIGN IS LIKE MULTIPLYING BY -1. AND EXPONENTS COME BEFORE MULTIPLICATION!

IMPORTANT:

$(-3)^2$ is 9

-3^2 is the same as $-(3^2)$

which is -9

Negative sign is NOT connected to the exponent here

Homework

- p. 19 (1 – 5, 7, 9 – 12)
- **NO CALCULATOR!**

- (9-12 are challenging: be careful!!!)