Laws of Exponents Day 1

Agenda

#tbt

Set up Unit 6

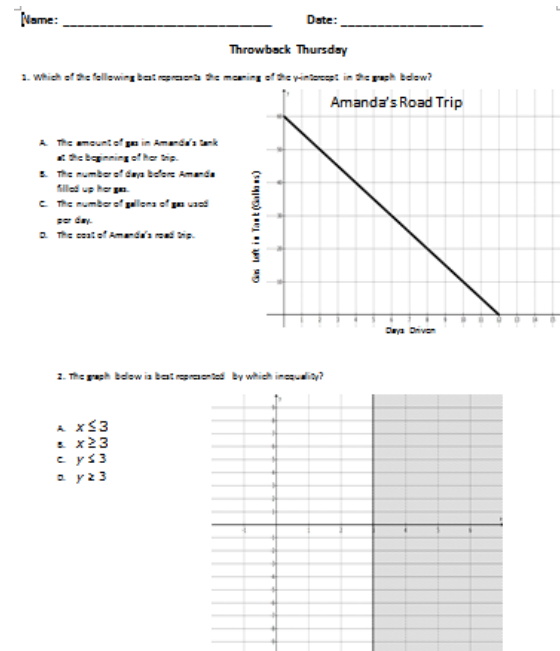Notes p.69-70

HW #1-18 DUE TMR

Reminders

No school Monday!

HW help posted at twitter.com/mskmath

Essential Question

How do I use the laws of exponents to simplify expressions with negative exponents?

Throwback Thursday

Name: _____ Date: _____

Throwback Thursday

1. Which of the following best represents the meaning of the y-intercept in the graph below?

Amanda's Road Trip

A. The amount of gas in Amanda's tank at the beginning of her trip.
B. The number of days before Amanda filled up her gas.
C. The number of gallons of gas used per day.
D. The cost of Amanda's road trip.

2. The graph below is best represented by which inequality?

A. $x \leq 3$
B. $x \geq 3$
C. $y \leq 3$
D. $y \geq 3$

Try your best on the "Throwback Thursday" paper! Remember, this should be a review. Show your work or explain your reasoning!

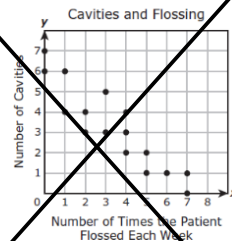When you are done, turn it in and then pick up all the papers.

Name: _____   Date: _____

Throwback Thursday

1. A dentist made the scatterplot below to show the number of cavities her patients had as it relates to the number of times they flossed their teeth each week.

Cavities and Flossing

Number of Cavities (y-axis)
Number of Times the Patient Flossed Each Week (x-axis)

Which of the following best describes the correlation for the data?

A. Positive correlation   C. Negative correlation
B. Nonlinear correlation   D. No correlation

2. Which of the following best represents the meaning of the y-intercept in the graph below?
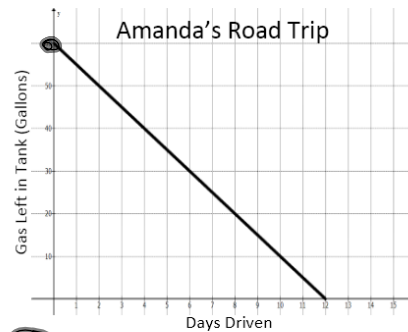
Amanda's Road Trip

Gas Left in Tank (Gallons)
Days Driven

A. The amount of gas in Amanda's tank at the beginning of her trip.
B. The number of days before Amanda filled up her gas.
C. The number of gallons of gas used per day.
D. The cost of Amanda's road trip.

3. The graph below is best represented by which inequality?

HDY VUX

A. $x \leq 3$
B. $x \geq 3$
C. $y \leq 3$
D. $y \geq 3$
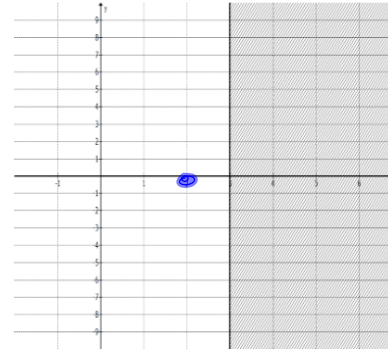
4. If the graph of $y = 9x + 4$ is translated 4 units up, which equation describes the new graph?

A. $y = 9x + 8$ C. $y = 13x + 8$
B. $y = 13x + 4$ D. $y = 4x + 4$

Set up Unit 6

- On page 67 or the next blank right hand page, set up unit 6!
- Your vocabulary will go on page 68!
- Your "6" tab will go on page 67.
- You may start a new notebook - BUT it must be at the start of a new unit.

UNIT 6

TITLE:

Polynomials

Page #	Page Title
68	WWK
69	Exponents Foldable
70	Integer exponents

Laws of Exponents Foldable

We will use this foldable for the next 4 days!! Keep up with it!!!!!

You can paperclip it to page 69 to keep it secure, or make a pocket.

Expanded Form

a^0
Exponent of Zero

a^{-n}
Negative Exponent

$a^m a^n$
Product of Powers

$\dfrac{a^m}{a^n}$
Quotient of Powers

$\left(a^m\right)^n$
Power of a Power

$(ab)^m$
Power of a Product

$\left(\dfrac{a}{b}\right)^m$
Power of a Quotient

$a^{\frac{m}{n}}$
Rational Exponent

Laws of Exponents

PROPERTIES OF EXPONENTS

Product of powers $a^m a^n = a^{m+n}$

Quotient of powers $\dfrac{a^m}{a^n} = a^{m-n}$

Power of a power $\left(a^m\right)^n = a^{mn}$

Rational exponent $a^{\frac{m}{n}} = \sqrt[n]{a^m}$

Negative exponent $a^{-n} = \dfrac{1}{a^n}$

- Fold in half (hot dog)

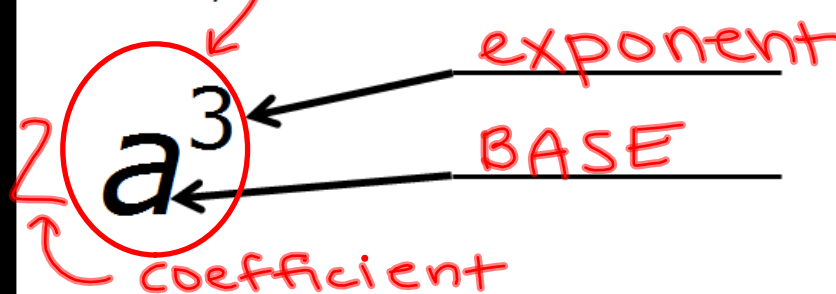- Cut the flaps until the dotted line. There should be 9 flaps total!

- When you are done...glue the white paper to page 70.

Laws of Exponents p. 70

Essential Question   How do I use the laws of exponents to simplify expressions with negative exponents?

What is a power?

exponent

BASE

a^3

coefficient

* only #s →
vse calc.
⌄

1. What does 3^3 mean? What does it equal?

$3 \times 3 \times 3 = 27$

$3 \cdot 3 \cdot 3$

2. What does x^4 mean?

$x \cdot x \cdot x \cdot x$

3. How would you rewrite the expression below?

$3 \cdot x \cdot x \cdot x \cdot y \cdot y$

$3^1 x^3 y^2$

Law of Exponents Foldable

EXPANDED FORM

$$a^0$$

EXPONENT OF ZERO

$$a^{-n}$$

NEGATIVE EXPONENT

Laws of Exponents Foldable

ex. $x^2 y^4 z^1$

$xx\,yyyy\,z$

Write out (base) times itself (exponent) times!

ex. $x^4 = x \cdot x \cdot x \cdot x$

ex. $(ab)^0 = 1$

$a^0 b^2 = 1 \cdot b^2$

$a^0 = 1 \qquad b^2$

ANYTHING to the zero power equals 1

ex.

x^{-2}

$\dfrac{1}{x^2}$

$\dfrac{1}{a^{-3}}$

$\dfrac{a^3}{1}$

$a^{-n} = \dfrac{1}{a^n}$

Cross the line to change the sign (fraction)

Laws of Exponents p. 70

Essential Question How do I use the laws of exponents to simplify expressions with negative exponents?

Power	Expanded Form	Simplified
3^{-3}	$\frac{1}{3^3} = \frac{1}{3\cdot3\cdot3}$	$\frac{1}{27}$
3^{-2}	$\frac{1}{3^2} = \frac{1}{3\cdot3}$	$\frac{1}{9}$
3^{-1}	$\frac{1}{3^1}$	$\frac{1}{3}$
3^{0}		1
3^{1}	3	3
3^{2}	$3\cdot3$	9
3^{3}	$3\cdot3\cdot3$	27

$\div 3$

$\div 3$

$\div 3$

$\div 3$

$\times 3$

$\div 3$

$\times 3$

$2^0 = 1$
$2^1 = 2$
$2^2 = 4$
$2^3 = 8$

Laws of Exponents p. 70

Essential Question   How do I use the laws of exponents to simplify expressions with negative exponents?

Simplify completely. Leave no negative exponents!

5. $x^2 y^0$

x^2

6. $(xy)^0 = 1$

7. 5^{-4}

CALC! $\dfrac{1}{625}$

MATH enter enter

8. $(3a)^{-2}$

9. $\dfrac{1}{x^{-2}}$

10. $x^2 y^{-4}$ $\dfrac{x^2}{y^4}$

11. $\left(\dfrac{4m^{-2}}{p^{-3}}\right)$ $\dfrac{4p^3}{m^2}$

Algebra I – Unit 6: Topic 1 – Integer Exponents

Practice – Integer Exponents

Name _____ Date _____ Period _____

Simplify the expressions below.

1. 4^{-2}

2. $(-5)^{-2}$

3. $\dfrac{1}{2^0}$

4. $\left(\dfrac{1}{4}\right)^2$

5. -5^2

6. $\dfrac{4}{2^{-3}}$

Simplified expressions are shown below. Fill in the box with the value that makes each equation true.

7. $4n^{\boxed{}} = \dfrac{4}{n^2}$

8. $\dfrac{a^{\boxed{}}}{3b^{\boxed{}}} = \dfrac{ab^3}{3}$

In the lab, the population of a certain bacteria doubles every month. A study uses the expression $3000 \bullet 2^m$ to model a population of 3000 bacteria after m months of growth.

9. What is the population of bacteria at the beginning of the study when $m=0$?

10. What is the population of bacteria at $m=-2$? What does this value represent?

Evaluate each expression for $x=-3$ and $y=5$.

11. $3y^{-2}$

12. $(4x)^{-2}$

13. $\dfrac{1}{x^{-3}y^2}$

14. $x^0 y^{-3}$

Simplify each expression.

15. $a^{-5}b^{-7}$

16. $a^1 c^0$

17. $\dfrac{7ab^{-2}}{3w}$

18. $\dfrac{15s}{5t^{-3}}$

HW Help: Integer Exponents

NO WORK = NO CREDIT = NO KIDDING

The HW wheel will be spun at the BEGINNING of class!

Hints:

#1 - 6. You can always check your answer in the calculator, but make sure your answer is a FRACTION.

7. What type of exponent makes a variable cross the line?

8. What is the ninja number? That is the exponent of any variable that doesn't have one!

9. Plug in m=0 to the equation.

10. Pug in m=-2 into the equation.

#11-14. Evaluate means to plug in those values for x & y. Make sure you use parenthesis!

#15-18. Use your foldable!!

Solutions:

1. $\dfrac{1}{16}$

2. $\dfrac{1}{25}$

3. 1

4. $\dfrac{1}{16}$

5. -25

6. 32

7. $4n^{-2}$

8. $\dfrac{a^1}{3b^{-3}}$

9. 3000

10. 750. This value represents the population of bacteria 2 months before the study began.

11. $\dfrac{3}{25}$

12. $\dfrac{1}{144}$

13. $-\dfrac{27}{25}$

14. $\dfrac{1}{125}$

15. $\dfrac{1}{a^5b^7}$

16. a

17. $\dfrac{7a}{3b^2w}$

18. $3st^3$