Division Properties of Exponents

Agenda

Warm-Up
HW Questions
Wheel Spin
Notes p. 72/Foldable
Card Match
HW #1-10

Reminders

Quiz Friday!

Essential Question

How do I use division properties of exponents to simplify expressions?

$x^1 \cdot x^3$
x^4

Warm-Up Tuesday

Have out your HW from this weekend!!!

$A = L \cdot W$

1. Katie is buying soil for a rectangular garden. If the length of the garden is $3x^2y^3$ units and the width of the garden is $9x^{-3}y^4$ units, what is the area of the garden?

$A = (3x^2y^3)(9x^{-3}y^4)$
$= 27x^{2+-3}y^{3+4} = 27x^{-1}y^7$

2. State the process used to answer the following question:

The width of a rectangular room is 20 feet. If the area is 200 ft^2, what is the length of the room?

$A = L \cdot W$
$200 = L \cdot 20$
divide

questions, comments, concerns?

Algebra 1 – Unit 6: Topic 1 – Multiplication Properties of Exponents

Practice – Multiplication Properties of Exponents

Name _____ Date _____ Period _____

Simplify the expressions below:

1. $n^6 \cdot n^2$ 2. $x^2 \cdot x^{-3} \cdot x^4$ 3. $(-3)^3 \bullet (-3)^2$ 4. $a^5 \cdot a^0 \cdot a^{-5}$

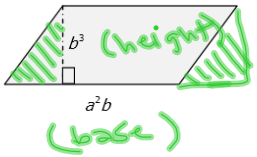
Simplify the expressions below:

5. $(x^2)^5$ 6. $(3^{-2})^{-4}$ 7. $(a^{-3})^4 \cdot (a^7)^2$ 8. $(p^4q^2)^7$

Find the missing exponent in each expression:

9. $a^{\square} \cdot a^6 = a^{10}$ 10. $(a^2b^{\square})^4 = a^8b^{12}$ 11. $(a^3b^6)^{\square} = \frac{1}{a^9b^{18}}$

12. Write an expression for the area of the figure below:



$A = b \cdot h$

$A = (a^2b)(b^3)$

a^2b^4

13. Which expression best represents $(3a^2b^3c)(-3ab)(-2a^3bc^3)$?

F $18a^6b^5c^4$

G $-18a^6b^3c^3$

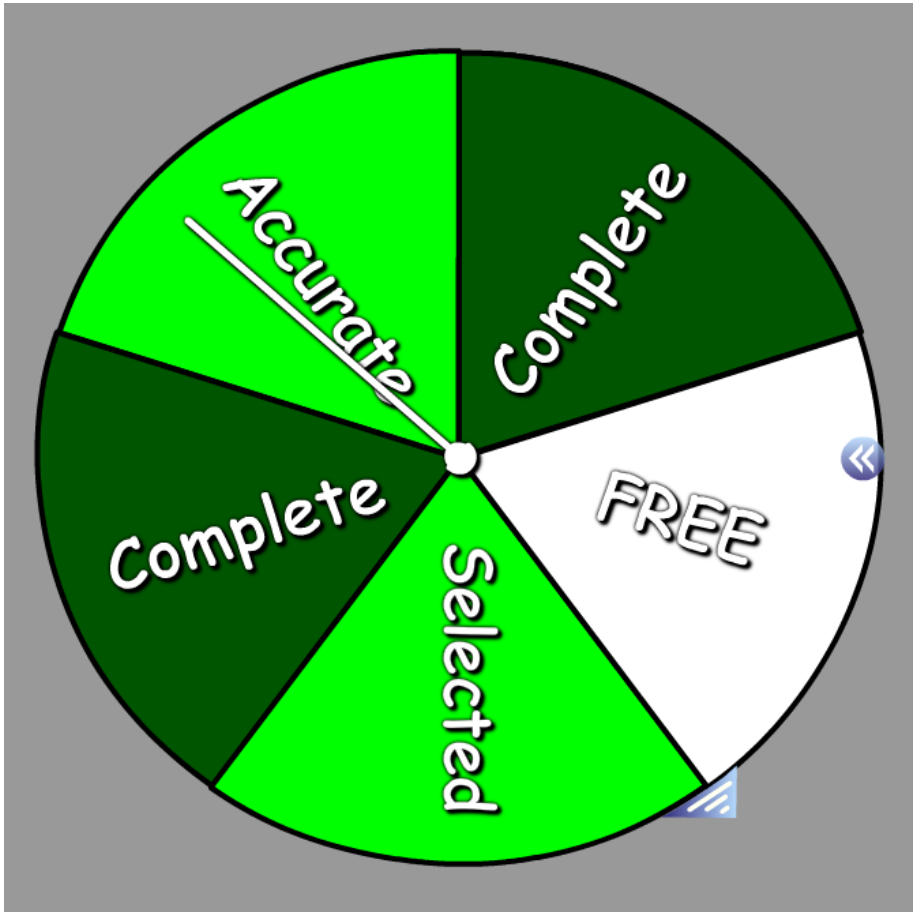
H $18a^6b^9c^4$

J $-8a^6b^5c^4$

14. Which expression describes the area in square units of a rectangle that has a length of $10x^3y^4$ units and a width of $5x^2y$ units?

F $2x^5y^4$
G $15x^5y^5$
H $50x^5y^4$
J $50x^5y^5$

Multiplication Prop HW



Wheel spin only applies to HW turned into the tray right now!!

Any late HW will be graded for ACCURACY.

2nd & 3rd comp.

Division Properties of Exponents

P. 72

Essential Question: How do I use division properties of exponents to simplify expressions?

Simplify the expressions below. Leave answers in exponential form.

1. $\frac{3^8}{3^2}$

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$ / $3 \cdot 3$

3^6

2. $\frac{-3x^7}{15x^3}$

$\frac{-3}{15} x^{7-3}$

$\frac{-3}{15} x^4$

$-\frac{1}{5} x^4$

3. $\frac{x^2}{x^5}$

x^{2-5}

x^{-3}

$\frac{1}{x^3}$

$\frac{1}{x^3}$

4. $\left(\frac{2x^3}{yz}\right)^3$

$\left(\frac{2x^3}{yz}\right)\left(\frac{2x^3}{yz}\right)\left(\frac{2x^3}{yz}\right)$

$\frac{2^3 (x^3)^3}{y^3 z^3}$

$\frac{8x^9}{y^3 z^3}$

5. $\left(\frac{ab^4}{c^2 d^3}\right)^5$

$\frac{a^5 (b^4)^5}{(c^2)^5 (d^3)^5}$

$\frac{a^5 b^{20}}{c^{10} d^{15}}$

Division Properties of Exponents

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

Quotient of Powers

$$\left(\frac{a}{b}\right)^m$$

Power of a Quotient

Division Properties of Exponents

ex. $\frac{x^7}{x^2} = x^{7-2} = x^5$

ex. $\frac{x^2}{x^{-3}} = x^{2+3} = x^5$

$$\frac{a^m}{a^n} = a^{(m-n)}$$

KEEP base, SUBTRACT exponents

Think of the fraction bar like a giant minus.

ex. $\left(\frac{2x}{y}\right)^3 = \frac{2^3 x^3}{y^3}$

$\left(\frac{2x}{y}\right)\left(\frac{2x}{y}\right)\left(\frac{2x}{y}\right)$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

DISTRIBUTE exponent to each part

Division Properties of Exponents

Essential Question: How do I use division properties of exponents to simplify expressions?

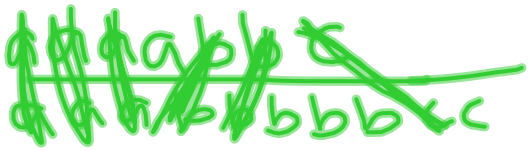
6. What is the simplified form of $\frac{a^4b^2c}{a^3b^5c^2}$?

A ab^3c^2

B $\frac{a}{b^3c^3}$

C $a^7b^7c^3$

D $\frac{a}{b^3c}$



$\frac{a}{b^3c}$

7. Which expression is equivalent to $\frac{27x^{-2}y^6}{3x^5y^2z^0}$?

A $\frac{9x^7y^4}{z}$

B. $\frac{y^4}{9x^3}$

C. $\frac{9y^4}{x^7}$

D. $\frac{9y^4}{x^7z}$

$\frac{27}{3}$ cal.

$\frac{1}{x^2x^5}$

Division Properties of Exponents

Essential Question: How do I use division properties of exponents to simplify expressions?

8. The area of a rectangle is $10x^6y^4$ square units.

If the width of the rectangle is $5x^2y^2$, what is the rectangle's length?

$A = L * W$

Divide!

$$\frac{10x^6y^4}{5x^2y^2} = \frac{10}{5}\,x^{6-2}\,y^{4-2} = 2x^4y^2$$

9. If the area of the rectangle below is $40x^3y$, what is the height?

$10xy$

Algebra I – Unit 6: Division Properties of Exponents

Practice –Division Properties of Exponents

Name _____ Date _____ Period _____

Simplify the expressions below:

1. $\frac{-3x^7}{6x^3}$

2. $\frac{15x^{-3}}{x}$

3. $\frac{8x^{10}y^7}{2x^6y^6}$

4. $\left(\frac{x^{-5}}{x^{-2}}\right)^5$

5. $\frac{x^9y}{(x^2y^9)^2}$

6. $\left(\frac{3b^2c}{6ab^3}\right)^{-2}$

7. A rectangular parking lot has an area of $10a^3b^6$ square yards. If the length of the park is $2a^3$, what is the width of the park?

8. Marlena was asked to find an expression that is not equivalent to 2^{12}. Which of the following is not equivalent to the given expression?

   F $(2^2)^6$

   G $(2^8)^4$

   H $(2^6)(2^6)$

   J $(2^3)(2^9)$

9. Which expression is equivalent to $(-5abc^4)(-3a^3c^2)(-4a^2b^4c^3)$?

   A $-12a^6b^5c^9$

   B $-12a^6b^4c^{24}$

   C $-60a^6b^5c^9$

   D $-60a^9b^9c^9$

10. The volume of a rectangular prism is $125x^3$ cubic units, and the area of its base is $25x^2y^2$ square units. What is the height of the prism in units if $x > 0$ and $y > 0$?

HW Help: Division Prop. of Exp

No work, no credit, no kidding!!

Help:

Use your exponent rules foldable!!!

1. DIVIDE coefficients (big #s) and SUBTRACT exponents (little #s)
2. You can get rid of the negative exponent first!
3. See #1. Be careful that you have the same base!
4. DISTRIBUTE your exponent to every part of the expression. OR you can simplify the inside first!
5. Expand the bottom first!
6. Try to simplify the inside FIRST.
7. A=L*W. If you have the area and length, you need to DIVIDE the 2 expressions.
8. Use your exponent rules...or try plugging into the calculator!
9. MULTIPLY coefficients, ADD exponents!
10. V=A*h. You have the volume and the area, so DIVIDE your expressions!

Solutions:

1: $-\frac{x^4}{2}$

2: $\frac{15}{x^4}$

3: $4x^4y$

4: $\frac{1}{x^{15}}$

5: $\frac{x^5}{y^{17}}$

6: $\frac{4a^2b^2}{c^2}$

7: $5b^6$

8: G

9: C

10: $\frac{5x}{y^2}$