

## From Yesterday

Simplify each. Make sure exponents in your answer are neither zero nor negative.

5. 
$$\frac{24a^{3}b^{-2}}{3a^{-4}b^{-9}} \longrightarrow \frac{2^{4}}{3} \cdot \frac{a^{3}}{3a^{-4}} \cdot \frac{b^{-2}}{b^{-9}}$$

$$= \underbrace{8 \cdot a^{3}a^{4}}_{3a^{-4}} \cdot \frac{b^{9}}{b^{2}}$$
This is one of several way to arrive at the same answer.
$$= \underbrace{8 \cdot a^{3}a^{4}}_{3a^{-4}} \cdot \frac{b^{9}}{b^{2}}$$

Some rules of exponents:

 $a^n \cdot a^m = a^{n+m}$  Product of Powers: Add exponents

 $a^1 = a$ 

 $(a^n)^m = a^{nm}$  Power to a Power: Multiply exponents

 $a^0=1$ 

 $(a^nb^m)^x = a^{nx} \cdot b^{mx}$  Power of a Product: "distribute" the exponent to everything inside parentheses.

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

 $\left| \frac{a^n}{a^m} \right| = a^{n-m}$  Quotient of Powers: Subtract exponents

 $\left(\frac{a^n}{b^m}\right)^x = \frac{a^{nx}}{b^{mx}}$ 

Power of a Quotient:
"distribute" the exponent to
everything inside parentheses.

6.  $(5c^{-4}d^3)^2(2cd^2)$ 

 $(25c^{-8})$   $(2c)^2$  First apply the Power of a Product rule to simplify the first parentheses.

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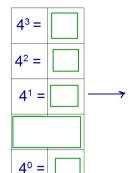
Secondly apply the Product of Powers rule to simplify the product of the two parentheses

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Finally, use the definition of a negative exponent to simplify.

Section 7-4

What should be in each blank?



43 =	64	
42 =	16	
41 =	4	_

40 = 1

43 =	64		43 =
42 =	16		<b>4</b> <sup>2</sup> =
41 =	4	->	41 =
4 =	?		4 <sup>2/2</sup> =

## Raising a number to the $\frac{1}{2}$ power is the same as doing what?

anything to the half power is the same as taking the square root of the base.

Why does the calculator give an ERROR message when x is negative?

Because the square root of a negative number is imaginary and the calculator is set to give only real number answers.

X	Y1
-1	ERROR
0	0
1	1
2	1.414
3	1.732
4	2
5	2.236
6	2.45
7	2.646
8	2.828
9	3
:	:
•	•
16	4
:	:
•	•
25	5

64

16

4

2

1

40 =

## Using a graphing calculator do the following:

- 1. Enter the following into  $Y_1$ :  $Y_1 = x^{\Lambda}(1/2)$
- 2. Press 2ND WINDOW set it up so that you see the following:

TblStart = 0

△Tbl = 1

Indpnt: Auto Ask

3. Press 2ND GRAPH to get to the table.

- Depend: Auto Ask
- 4. Scroll up and down. Notice when Y<sub>1</sub> is an integer value.

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$
 "the nth root of a"

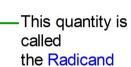


This symbol is called a radical it indicates finding a root.

The number in this spot is called the Index.

It tells what root you are to find.

If there is no index it means Square Root.



Rational Exponents represent radicals (roots)

$$a^{\frac{m}{n}} = \sqrt[n]{a^m} \text{ or } (\sqrt[n]{a})^m$$