$\sqrt{72}$

Student A:

$\sqrt{36} \times \sqrt{2}$

$6\sqrt{2}$

$\frac{2}{2}$

Student B

$\sqrt{9} \cdot \sqrt{8}$

$3\sqrt{8}$

$\frac{1}{2}$

Student C

$\sqrt{9} \cdot \sqrt{8}$

$3\sqrt{8}$

$3(\sqrt{4} \times \sqrt{2})$

$\frac{2}{2}$ $3(2\sqrt{2})$

$6\sqrt{2}$

$\sqrt{40}$

$\sqrt{4} \times \sqrt{10}$

$2\sqrt{10}$ $\quad$ $\cancel{{}^{2}\sqrt{10}}$

Check-Up Time...

1. Express each of the following as a MIXED radical in SIMPLEST form:

$(a)\sqrt{48}$

$\sqrt{16} \times \sqrt{3}$

$= 4\sqrt{3}$

$(b)\sqrt[3]{24}$

$\sqrt[3]{8} \times \sqrt[3]{3}$

$2\sqrt[3]{3}$

$(c)\sqrt[3]{-81}$

$\sqrt[3]{-27} \times \sqrt[3]{3}$

$-3\sqrt[3]{3}$

$(d)5\sqrt[4]{162}$

$5(\sqrt[4]{81} \cdot \sqrt[4]{2})$

$5(3\sqrt[4]{2})$

$15\sqrt[4]{2}$

2. Express each of the following as an ENTIRE radical:

$(a)3\sqrt{5}$

$\sqrt{3^2 \cdot 5}$

$\sqrt{45}$

$(b)-4\sqrt{3}$

$-\sqrt{(4)^2 \cdot 3}$

$-\sqrt{48}$

$(c)2\sqrt[3]{9}$

$\sqrt[3]{2^3 \cdot 9}$

$\sqrt[3]{72}$

$(d)2\sqrt[5]{27}$

$\sqrt[5]{2^5 \cdot 27}$

$\sqrt[5]{864}$

Practice Problems...

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#4, 5, 10, 11, 12, 14, 15, 16, 17, 18, 20, 21 22

How am I doing so far???

- Shall we find out...

Summative Review
Page 221

$Q \rightarrow$ Rat.
$\overline{Q} \rightarrow$ Irrat.

#1, 3, 4, 7, 9, 11

$\sqrt{81} \rightarrow Q$

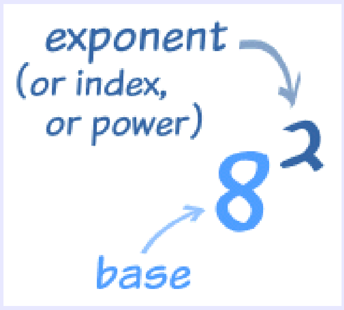
$\sqrt[4]{81} \rightarrow Q$

$\sqrt[3]{12} \rightarrow \overline{Q}$

$\sqrt[5]{25} \rightarrow \overline{Q}$

$\rightarrow$ Roots on Calculator
$\rightarrow$ Q or $\overline{Q}$
$\rightarrow$ Ordering Radicals
$\rightarrow$ Simplifying Radicals
$\rightarrow$ Mixed to Entire

Laws of Exponents



The exponent of a number says **how many times to multiply** the number.

In this example: $\mathbf{8^2 = 8 \times 8 = 64}$

- In words: 8^2 could be called "8 to the second power", "8 to the power 2" or simply "8 squared"

Product Law:

"BASES MUST BE THE SAME!!"

The law that $x^m x^n = x^{m+n}$

With $x^m x^n$, how many times will you end up multiplying "x"? *Answer:* first "m" times, then **by another** "n" times, for a total of "m+n" times.

Example: $x^2x^3 = (xx) \times (xxx) = xxxxx = x^5$

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

$$x^7 \cdot y^4 = x^7y^4$$

The multiplication law states that when multiplying two powers with the same base we add the exponents.

$$(y^3)(y^2) = y^5$$

These have the same base.

$$(y^3)(y^2) = y^5$$

The five comes from the addition of three and two... (2 + 3 = 5)

Why Add?

ex.

$$3^7 \times 3^{10} = 3^{17}$$

$\cancel{8^4}$

1. Simplify the following using the multiplication law.

a. $(x^2)(x^3)$

$= x^5$

b. $(2x^4)(3x^2)$

$= 6x^6$

c. $(-2x^2)(4x^3)(2x^4)$

$= -16x^9$

Quotient Law:

The law that $x^m/x^n = x^{m-n}$

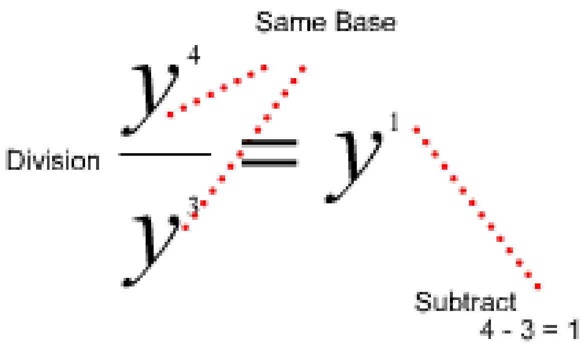
Like the previous example, how many times will you end up multiplying "x"? Answer: "m" times, then **reduce that** by "n" times (because you are dividing), for a total of "m-n" times.

Example: $x^{4-2} = x^4/x^2 = (xxxx) / (xx) = xx = x^2$ $\frac{\cancel{x}\cancel{x}xx}{\cancel{x}\cancel{x}}$

(Remember that x/x = 1, so every time you see an x "above the line" and one "below the line" you can cancel them out.)

*

The division law states that when dividing powers with the same base we subtract the exponents.



Why does this work?

$$\frac{x^{15}}{x^3} = x^{12} \qquad \frac{x^{15}}{x^7} = x^8$$

$$\frac{10^{14}}{10^1} = 10^{13}$$

2. Simplify each of the following using the division law.

a. $\dfrac{x^8}{x^5}$ $= x^3$

b. $\dfrac{y^7}{y^9}$ $= y^{-2}$

c. $\dfrac{15x^5}{3x^2}$ $= 5x^3$

d. $\dfrac{100x^{13}}{25x^7}$ $= 4x^6$

What about these?

$$\frac{15m^9}{4m^3}$$

$$\frac{(4x^3)(3x^4)}{4x^2}$$

$$\frac{24a^{10}b^6}{4a^2b^{12}}$$

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#3, 4, 5

Attachments

NOTES - Standard to Vertex Form.pdf