

Unit 2: Simplifying Expressions in Exponential Form

- apply laws
- adding ^{like} terms
- following BEDMAS

Recall: Adding like terms

ex.

↳ same variable with the same exponent
↳ coefficient can be different

$$x^2 + \underline{x} + \underline{2x} + xy$$



$$x^2 + 3x + xy$$

To add like terms, simply add their coefficients (the variable and the exp stays the same).

$$rx^n + sx^n = (r+s)x^n$$

Evaluate the following expression

$$\frac{(2x^2y^3 + 3x^2y^3)^2}{25x^4y^6}$$

any like terms to collect?

B
E
D
M
A
S

$$\frac{(5x^2y^3)^2}{25x^4y^6} = \frac{5^2(x^2)^2(y^3)^2}{25x^4y^6}$$

$$\frac{5^2x^4y^6}{25x^4y^6} = \frac{5^2x^4y^6}{5^2x^4y^6} = 5^{2-2}x^{4-4}y^{6-6}$$

convert to a power w base five

$$= 5^0x^0y^0 = 1 \cdot 1 \cdot 1 = 1$$

B
E
D
M
A
S

$$\left(\frac{3x^{-2}y^3}{2xy^{-2}z} \right)^2$$

* worry about
negative at the
end!

$$\left(\frac{3x^{-2-1}y^{3-(-2)}}{2z} \right)^2$$

$$\left(\frac{3x^{-3}y^5}{2z} \right)^2$$

$$\frac{3^2 (x^{-3})^2 (y^5)^2}{2^2 z^2}$$

$$\frac{3^2 x^{-6} y^{10}}{2^2 z^2} = \frac{3^2 y^{10}}{2^2 x^6 z^2}$$

B
E
D
M
A
S

$$\frac{(-3)^2 \times (-5)^6}{-(3 \times 5^3)^3} \quad (6)$$

$$\frac{3^2 \times 5^6}{-3^3 \times (5^3)^3} \quad (5)$$

$$\frac{3^2 \times 5^6}{-3^3 \times 5^9} \quad (2)$$

$$-3^{2-3} \times 5^{6-9} = \frac{-3^{-1} \times 5^{-3}}{1} = -\frac{1}{3^1 \times 5^3} \quad (3)$$

$$(-x)^2 = x^2 \quad | \quad (-x)^3 = -x^3$$

$$-x^2 = -x^2$$

$x \rightarrow$ 'x' variable

$x \rightarrow$ multiplication sign

$$(-2x)^2 = 4x^2$$

$$-2x^2 = -2x^2$$

The negative sign is mobile

$$\frac{1}{-2} = \frac{-1}{2} = -\frac{1}{2} = -0.5$$

S
D
3
D
F
B

$$\left[\left(\frac{-8h^7}{16hi} \right)^3 \right]^{-2}$$

$$\left[\left(\frac{-2^3 h^7}{2^4 h i} \right)^3 \right]^{-2} \quad (2)$$

$$\left[\left(\frac{-2^{3-4} h^{7-1}}{i} \right)^3 \right]^{-2}$$

$$\left[\left(\frac{-2^{-1} h^6}{i} \right)^3 \right]^{-2} \quad (5)$$

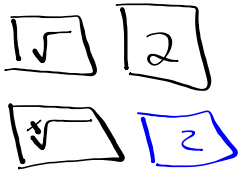
$$\left(\frac{-2^{-1} h^6}{i} \right)^{-6} \quad (6) \quad (7)$$

$$\frac{(2^{-1})^{-6} (h^6)^{-6}}{i^{-6}} \quad (5)$$

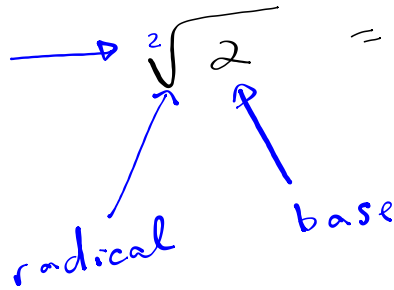
$$= \frac{2^6 h^{-36}}{i^{-6}} = \frac{2^6 i^6}{h^{36}} \quad (3)$$

Unit 3 : Radicals converted to Exponents

- what's a radical
- convert exp
- apply exp law



root
index



$$= 1.414^2 \dots$$

★ if your math expression has powers and radicals, convert your radicals to powers.

ConversionRadicals \longleftrightarrow Exponential
Number
(Power)

$$\sqrt[n]{a^m} \longleftrightarrow a^{\frac{m}{n}}$$

$$\sqrt{x} \longleftrightarrow x^{\frac{1}{2}}$$

$$\sqrt[3]{a} \longleftrightarrow a^{\frac{1}{3}}$$

$$\sqrt[4]{a^8} \longleftrightarrow a^2$$

$$\sqrt[2]{a^2} \longleftrightarrow a^1$$

$$\sqrt[3]{\left(\frac{1}{2}\right)^1} \longleftrightarrow \left(\frac{1}{2}\right)^{\frac{1}{3}} = \frac{1^{\frac{1}{3}}}{2^{\frac{1}{3}}}$$

$$\sqrt{\frac{1}{a}} \longleftrightarrow \left(\frac{1}{a}\right)^{\frac{1}{2}}$$

$$\sqrt[2]{x^{\frac{1}{2}}} \longleftrightarrow x^{\frac{\frac{1}{2}}{2}} = x^{\frac{1}{2} \times \frac{1}{2}} = x^{\frac{1}{4}}$$

$$\sqrt{\frac{1}{2}} \longleftrightarrow x^{\frac{1/2}{1}} = x^{\frac{1}{1} \times \frac{2}{1}} = x^2$$

$$\frac{\sqrt{x}}{4} \longleftrightarrow \frac{x^{\frac{1}{2}}}{4}$$

Simplify :

$$a^3 \cdot \sqrt[5]{a^2}$$

$$a^3 \cdot a^{\frac{2}{5}} \quad (1)$$

$$a^{\frac{5 \times 3}{5 \times 1} + \frac{2}{5}}$$

$$a^{\frac{15}{5} + \frac{2}{5}}$$

$$a^{\frac{15+2}{5}}$$

$$a^{\frac{17}{5}}$$

Simplify:

$$\frac{1}{5^3} \cdot \sqrt[4]{25^{-5}}$$

$$\frac{1}{5^3} \cdot 25^{-\frac{5}{4}}$$

$$\frac{1}{5^3} : (5^2)^{-\frac{5}{4}} \quad (5)$$

$$\frac{1}{5^3} \cdot 5^{\frac{2}{1} \cdot \frac{5}{4}} = \frac{1}{5^3} \cdot 5^{\frac{10}{4}} = \frac{1}{5^3} \cdot \frac{5^{-\frac{5}{2}}}{1}$$

$$= \frac{5^{-\frac{5}{2}}}{5^3} \quad (2)$$

$$= 5^{-\frac{5}{2} - \frac{3 \times 2}{1 \times 2}}$$

$$= 5^{-\frac{5-6}{2}} = 5^{-\frac{11}{2}} = \frac{1}{5^{-\frac{11}{2}}} \quad (3)$$

B
E
U
S
A

$$16 \cdot \sqrt{\left(\frac{1}{32}\right)}$$

Rewrite the # as a power of 2.

$$2^4 \cdot \sqrt{\left(\frac{1}{2^5}\right)}$$

$$2^4 \cdot \left(\frac{1}{2^5}\right)^{\frac{1}{2}} \quad (7)$$

$$2^4 \cdot \frac{1^{\frac{1}{2}}}{(2^5)^{\frac{1}{2}}} \quad (5) = 2^4 \cdot \frac{1}{2^{\frac{5}{1} \times \frac{1}{2}}} = \frac{2^4}{1} \cdot \frac{1}{2^{\frac{5}{2}}}$$

$$= \frac{2^4}{2^{\frac{5}{2}}} \quad (2) = 2^{\frac{2 \times 4}{2} - \frac{5}{2}} = 2^{\frac{3}{2}}$$

$$\begin{aligned} 2^4 &= 16 \\ 2^5 &= \frac{1}{32} \\ 2^5 &= 32 \end{aligned}$$

P 3.16
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