

M10 - 4.4 - Negative Exponents Laws Notes

Negative Exponents

$$x^{-2} = \frac{1}{x^2}$$

Bring to the bottom, make exponent positive

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

$$\frac{1}{x^{-2}} = \frac{x^2}{1}$$

Bring to the top, make exponent positive

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

$$3a^{-2} = \frac{3}{a^2}$$

Bring to the bottom, make exponent positive

Notice the 3 doesn't come down

$$3^{-3}a^{-2} = \frac{1}{3^3a^2}$$

Bring to the bottom, make exponent positive

$$(2x)^{-3} = \frac{1}{(2x)^3} = \frac{1}{8x^3}$$

Bring to the bottom, make exponent positive

$$\frac{x^{-2} + 5}{3} \neq \frac{5}{3x^2}$$

Step 1

When working with negative exponents:

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

Start with a fraction "Over" sign.
Put anything not moved!
Move whatever needs to be moved.
If nothing is left on the top, put a 1.

When you can flip it!

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

Distribute Exponents

Bring to the bottom, make exponent positive
Bring to the top, make exponent positive

OR

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

Flip it and make the exponent positive

Alternate Subtraction Methods

Theory

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

Subtract from the top

$$\frac{x^2}{x^5} = \frac{\cancel{x} \times \cancel{x} \cdot 1}{\cancel{x} \times \cancel{x} \times x \times x \times x} = \frac{1}{x^3}$$

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

Subtract from Bottom

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

Bring Up, Add

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

Bring Down, Add

OR

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

Subtract

$$\frac{x^{-2}}{x^3} = \frac{1}{x^{3-(-2)}} = \frac{1}{x^5}$$

Subtract From Bottom