1.7 Negative Exponents

Warm up: Evaluate using the calculator

2^2 = 2^{-2} =

-2^2 = -2^{-2} =

$(-2)^2$ = $(-2)^{-2}$ =

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

Let's see what a negative exponent means…

$4^3 \div 4^5$

$= 4^{3-5}$

$= 4^{-2}$

$4^3 \div 4^5$

$= \frac{4\times4\times4}{4\times4\times4\times4\times4}$

$= \frac{1}{4^2}$

What I call
FLIP AND SWITCH
FLIP the base, and SWITCH the exponent to positive

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

A base raised to a NEGATIVE exponent is equivalent to 1 over the original base with the same exponent but positive .

EX 1: Write with a positive exponent

a) $3^{-2} =$ _____

b) $2^{-2} =$ _____

c) $(10^2)^{-2} =$ _____

d) $p^{-3} =$ _____

e) $\frac{a^3}{a^7} =$ _____

f) $\frac{b^5}{b^{10}} =$ _____

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2(e) $\left(\frac{3a^{-2}}{b^4}\right)^{-2}$ **5(f)** $\left(\frac{3^3 3^{-2}}{3^{-1}}\right)^{-2}$ **8(b)** 0.01

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9(i) $(0.01)^2(0.1)^{-1}$ **10(e)** $(a^2b^{-1})(a^{-2}b^3)$ **11(e)** $\left(\frac{a^4}{2b^{-2}}\right)^{-3}\left(\frac{4b^{-1}}{a^8}\right)^{-2}$

Practice:
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