Date: 01.31.19

III. Negative Integer Exponents:

$2^3 = 2 \cdot 2 \cdot 2 = 8$

$2^0 = 1$

$2^3 \cdot 2^{-3} = 2^{3+(-3)} = 2^0 = 1$

$8 \cdot \frac{1}{8} = 1$

reciprocals:

2 numbers whose product is 1

Example: $7 ; \frac{1}{7}$

$-\frac{2}{3} ; -\frac{2}{3}$

$0.7 ; \frac{10}{7}$

$-0.23 ; -\frac{100}{23}$

Any numbers to a negative power is the same as its reciprocal to the positive power.

$2^{-3} = \left(\frac{1}{2}\right)^3$

I am free to move a factor to the other part of the fraction IF I change the sign of the exponent.

$$\frac{2^{-3}}{1} = \frac{1}{2^3} \text{ or } \frac{1}{8}$$

$$\frac{1}{5ab^{-2}} = \frac{b^2}{5a}$$

Review:

1) $x^2 \cdot x^3 = x^5$

2) $(x^3)^2 = x^6$

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

3) 3rd prop. of exponents:

$$\frac{x^5}{x^3} = \frac{x \cdot x \cdot x \cdot x \cdot x}{x \cdot x \cdot x} = \boxed{x^2}$$

$$\cdot x^{5-3} = \boxed{x^2}$$

$$\frac{49x^7y^3}{35x^4y^{10}} = \boxed{\frac{7x^3}{5y^7}}$$

3. (a)

$$8^{-1} + 9^{-1}$$

$$= \frac{1}{8} + \frac{1}{9}$$

$$= \frac{9+8}{72}$$

$$= \boxed{\frac{17}{72}}$$

2 step method:

1) Mul. your denominators
2) start with upper left & cross multiply.

$$\frac{4}{9} - \frac{3}{7} = \frac{28-27}{63} = \frac{1}{63}$$

$$\frac{3}{x} + \frac{7}{y} = \frac{3y+7x}{xy}$$

3. (b) $(8^{-1})^{-2}$

$$= \left(\frac{1}{8}\right)^{-2} \text{ or } 8^{\checkmark} = \boxed{64}$$

6. (a) $\frac{p^3}{p^4} = \boxed{1/p}$

6. (b) $\left(\frac{4}{y}\right)^3 \left(\frac{2}{y}\right)^4$

$= \boxed{\frac{1024}{y^4}}$

7. (b) $\left(\frac{x}{3}\right)^{-1} = \boxed{\frac{3}{x}}$

7. (a) $(-3x^4)^5 (9x^3)^{-1}$

$= (-3)^5 (x^4)^5 (9)^{-1} (x^3)^{-1}$

$= (-3)^5 (9^{-1}) x^{10} \cdot x^{-3}$

$= (-3)^5 (9)^{-1} x^7$

$= -243 x^7 9^{-1}$

$= \frac{-243x^7}{9}$

$= \boxed{-27x^7}$

8. (b) $\left(\frac{x^{-4}y^5}{3}\right)^{-2}$

$= \frac{x^8 y^{-10}}{3^{-2}}$

$= \frac{x^8 3^2}{y^{10}}$

$= \boxed{\frac{9x^8}{y^{10}}}$