

# Warm - up:

Tuesday 8/20

Simplify

1.  $(-3h^9)^3$

$-3^3 h^{9 \cdot 3}$

$-3 \cdot -3 \cdot -3$

$-27h^{27}$

2.  $(y^4 d^6)^8$

$y^{4 \cdot 8} d^{6 \cdot 8}$

$y^{32} d^{48}$

3.

$x^{3x+1} = x^{10}$

$$\begin{array}{r|l} 3x+1 & 10 \\ -1 & -1 \\ \hline 3x & 9 \\ \hline \frac{3x}{3} & \frac{9}{3} \end{array}$$

$x=3$

4.  $h^{4x} = h^{2x-3}$

$$\begin{array}{r|l} 4x & 2x-3 \\ -2x & -2x \\ \hline 2x & -3 \\ \hline \frac{2x}{2} & \frac{-3}{2} \end{array}$$

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

## Homework Questions

$$(8) (x^2y)(xy)(x) = x^4y^2$$

$$x^{2+1+1} = x^4$$

$$y^{1+1} = y^2$$

$$(18) (2a)(2b)(2c)(2d)(2e)(2f)(2g)(2h)(2i)$$

$$512abcdehghi$$

## Zero Exponent Rule:

-anything raised to the power of zero is one.  $a^0=1$

Ex:  $(16x^2y^5)^0 = 1$

$$16x^0y^5$$

$$16 \cdot 1 \cdot y^5$$

$$\boxed{16y^5}$$

$$(125a^3)^0 =$$

# Division with exponents!

Take a minute to attempt the half sheet you picked up.

	Value		Value		Value
$\frac{6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 \cdot 6}{6 \cdot 6 \cdot 6}$	216	$\frac{6^6}{6^3}$	216	$6^3$	216
$\frac{4 \cdot 4 \cdot 4}{4 \cdot 4 \cdot 4 \cdot 4 \cdot 4}$	$\frac{1}{16}$	$\frac{4^3}{4^5}$	$\frac{1}{16}$	$\frac{1}{4^2}$	$\frac{1}{16}$
$\frac{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5}{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5}$	1	$\frac{5^5}{5^5}$	1	$5^0$	1

What pattern did you notice about dividing exponents? Discuss with your group. How would you simplify  $\frac{r^2}{r^5}$ ?

when the bases are the same we subtract the exponents

$$\frac{\cancel{r} \cdot \cancel{r}}{\cancel{r} \cdot \cancel{r} \cdot r \cdot r \cdot r} = \frac{1}{r^3}$$

What do you notice?

## Quotient of Powers:

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

Ex:  $\frac{x^7}{x^3} = \frac{\cancel{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}}{\cancel{x \cdot x \cdot x}} = x^4$

$x^{7-3} = x^4$

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

$$\frac{g^3 h^5}{g h^2} = \frac{\cancel{g} \cancel{g} \cancel{g} \cancel{h} \cancel{h} \cancel{h} \cancel{h} \cancel{h}}{\cancel{g} \cdot \cancel{h} \cancel{h}} = g^2 h^3$$

$g^{3-1} h^{5-2}$

$$g^2 h^3$$

**REMEMBER:** Any variable or number divided by itself equals one!

## Power of a Quotient:

$$\left(\frac{b}{a}\right)^m = \frac{b^m}{a^m}$$

$$\left(\frac{3}{5}\right)^4 = \frac{3^4}{5^4}$$

$$\left(\frac{3p^3}{7}\right)^2 = \frac{3^2 p^{3 \cdot 2}}{7^2}$$

$$= \frac{9p^6}{49}$$