Grade 9
Warm Up

Get those brain muscles pumping!!!

Without your calculators evaluate the following expressions:

1) $$\frac{3^2(5^0 + 2 + 2^2)}{2(5 + 4^2)}$$

2) $$\frac{4^2(3^4 \div 2^0)}{2^4(3^4 - 2^0)}$$

$$\frac{=9(1+2+4)}{2(5+16)} = \frac{63}{42} = \frac{3}{2}$$

$$\frac{=16(81 \div 1)}{16(81 - 1)} = \frac{81}{80}$$

3) $$\frac{2^4(4^3 \div 2^2) - 4^0}{3(3^4 + 2^2)}$$

Write each expression as a product and then evaluate the following:

1) $3^2 \times 3^2$

$3 \times 3 \times 3 \times 3$

$= 3^4$

2) $2^2 \times 2^5$

$2^{2+5} = 2^7$

Do you notice anything???

3) $(-5)^2 \times (-5)^4 = (-5)^6$

$$2^3 \times 5^2$$

$$= 2 \times 2 \times 2 \times 5 \times 5$$

Exponent Law for a Product of Powers

To multiply powers with the same base, add the exponents.

$$a^m \text{ x } a^n = a^{m+n}$$

must be the same base

The variable "a" is any ~~interger~~ real number, except 0.

The variable "m" and "n" are any whole numbers.

Write each of the following as a single power and then evaluate.

1) $7^2 \times 7^4$ 2) $(-2)^5 \times (-2)^3$ 3) $4^5 \times 4^1$

$$(-2)^8$$

$$4^6$$

$$3^2 \times 3^1 \times 3^4 = 3^{\boxed{7}}$$

$$2^{2.1} \times 2^{3.3} \times 2^{1.2} = 2^{\boxed{6.6}}$$

What happens when we divide powers with the same base?

1) $\dfrac{2^6}{2^2}$

$= \dfrac{2 \times 2 \times 2 \times 2 \ \times \ 2 \times 2}{2 \times 2}$ $= 2^4$

2) $\dfrac{7^9}{7^4}$ $= 7^{5}$ $9-4$

Do you notice anything???

3) $\dfrac{(-5)^7}{(-5)^3}$ $= (-5)^4$

Exponent Law for a Quotient of Powers

To divide powers with the same base, subtract the exponents.

$$a^m \div a^n = a^{m-n} \qquad \text{Where } m \geq n$$

must be the same base

The variable "a" is any interger, except 0.

The variable "m" and "n" are any whole numbers.

Class/Homework

Pages 76 and 77.

Questions:
4,5,6 and 7.