2. Write as a quotient of two powers and then as a single power.

a) $(7\times7\times7\times7\times7)\div(7\times7\times7\times7)$

$= 7^5 \div 7^4$

$= 7^{5-4}$

$= 7^1$

b) $\dfrac{4\times4\times4\times4\times4\times4\times4\times4\times4}{4\times4\times4}$

$= \dfrac{4^9}{4^3}$

$= 4^{9-3}$

$= 4^6$

3. Write the following as multiplication or division of two powers.

a) $(-6)^{8-2}$

$= (-6)\times(-6)\times(-6)\times(-6)\times(-6)\times(-6)\times(-6)\times(-6)\div(-6)\times(-6)$

b) $(-2)^{3+1}$

$= [(-2)\times(-2)\times(-2)]\cdot[(-2)]$

4. Write as a single power then evaluate.

a) $\dfrac{(7\times7)\times(7\times7)\times(7\times7)\times(7\times7)}{(7\times7\times7\times7)}$

$= \dfrac{7^2\times7^2\times7^2\times7^2}{7^4}$

$= \dfrac{7^{2+2+2+2}}{7^4}$

$= \dfrac{7^8}{7^4}$

$= 7^{8-4}$

$= 7^4$

b) $\frac{3\times3\times3\times3\times3\times3}{(3\times3\times3)\times(3\times3\times3)}$

$= \frac{3^6}{3^3 \times 3^3}$

$= \frac{3^6}{3^6}$

$= 3^{6-6}$

$= 3^0$

$= 1$

Assignment Pg. [redacted]

↳ See Homework Board.

B: Exponent Laws Continued

Powers raised to an Exponent

$(a^m)^n = a^{mxn}$

$(3^2)^3 = 3^{2x3} = 3^6$

$(3x3)^3$

$(3x3) \times (3x3) \times (3x3)$

$=3^6$

Examples:

1. Write as a single power & evaluate.

a. $(4^3)^4$

$= (4)^{3x4}$

$= 4^{12}$

$=16777216$

b. $((-8)^2)^3$

$= (-8)^{2x3}$

$=(-8)^6$

$=262144$

2. Write as a power raised to an exponent.

a. $(3x3x3) x(3x3x3) x (3x3x3) x (3x3x3)$

$= (3^3) \times (3^3) \times (3^3) \times (3^3)$

$= (3^3)^4$

b. $(4x4) \times (4x4) \times (4x4)$

$= (4^2) \times (4^2) \times (4^2)$

$= (4^2)^3$

Quotients Raised to an Exponent

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

Bring the exponent onto everything in the brackets!

Examples:

1. Write as a quotient of two powers & evaluate.

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

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

$= \frac{64}{125}$

Reduce if you can!

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

$= \frac{(-2)^6}{3^6}$

$= \frac{64}{729}$

Reduce if you can!

Product Raised to an exponent

$(a \times b)^m = a^m \times b^m$

$(4 \times 5)^3 = 4^3 \times 5^3$

Examples:

1. Write as the product of two powers and evaluate.

a. $[6 \times (-2)]^4$ Bring the exponent onto everything in the brackets!

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

$= 1296 \times 81$

$= 104976$

b. $(2 \times 3)^3$

$= 2^3 \times 3^3$

$= 8 \times 27$

$= 216$

c. $(-5 \times 4)^2$

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

$= 25 \times 16$

$= 400$

Combining Laws

Examples:

1. Express as a single power & evaluate.

a. $(2^2)^4 \times 2^3$

$= 2^{2x4} \times 2^3$

$= 2^8 \times 2^3$

$= 2^{8+3}$

$= 2^{11}$

$= 2048$

b. $\dfrac{[(-3)^2]^4 \times (-3)^4}{(-3)^3}$

$= \dfrac{(-3)^{2x4} \times (-3)^4}{(-3)^3}$

$= \dfrac{(-3)^8 \times (-3)^4}{(-3)3}$

$= \dfrac{(-3)^{8+4}}{(-3)^3}$

$= \dfrac{(-3)^{12}}{(-3)^3}$

$= (-3)^{12-3}$

$= (-3)^9 = -19683$

c. $(-3^3)^4$

$= (-1 \times 3^3)^5$

$= (-1)^5 \times (3^3)^5$

$= -1 \times 3^{3x5}$

$= -1 \times 3^{15}$

$= -1 \times 14348907$

$= -14348907$

***If you forget about the negative sign your answer may have the wrong sign! ***

Assignment:

~~Assignment: Page 106 # 1c, 2b~~

See Homework Board