

Today's Learning Goal(s):

Date: _____

By the end of the class, I will be able to:

- a) evaluate a power involving an integer exponent.
- b) simplify expressions involving integer exponents.

Last day's work: p. 204 #1 – 9

Lunch?

Use individual white boards...if markers available?

4.2 Working with Integer Exponents

Date: Apr. 3/17

Ex.1 Simplify.

a) $(5^3)(5^4)$

$$= 5^{3+4}$$

$$= 5^7$$

$$b^m \times b^n$$

$$= b^{m+n}$$

b) $13^6 \div 13^2$

$$= 13^{6-2}$$

$$= 13^4$$

$$b^m \div b^n$$

$$= b^{m-n}$$

c) $(6^3)^4$

$$= 6^{3 \times 4}$$

$$= 6^{12}$$

$$= 6^{(b^m)^n}$$

$$= b^{mn}$$

d) $3^4 \div 3^4$

$$= 3^{4-4} \quad \text{or} \quad \frac{3^4}{3^4}$$

$$= 3^0$$

$$= 1$$

$$b^0 = 1$$

e) $5^3 \div 5^5$

$$= 5^{3-5}$$

$$= 5^{-2}$$

$$= \left(\frac{1}{5}\right)^2 \rightarrow \frac{1^2}{5^2} = \frac{1}{5^2}$$

$$\therefore b^{-n} = \frac{1}{b^n}$$

See p. 217

Name	Symbol	Multiple of the Metre	Multiple as a Power of 10
terametre	Tm	1 000 000 000 000	10^{12}
gigametre	Gm	1 000 000 000	10^9
megametre	Mm	1 000 000	10^6
kilometre	km	1 000	10^3
hectometre	hm	100	10^2
decametre	dam	10	10^1
metre	m	1	
decimetre	dm	0.1	
centimetre	cm	0.01	
millimetre	mm	0.001	
micrometre	μm	0.000 1	
nanometre	nm	0.000 01	
picometre	pm	0.000 001	
femtometre	fm	0.000 000 001	
attometre	am	0.000 000 000 001	

$$\begin{aligned} &\rightarrow 10^3 \div 10 \\ &= 10^{3-1} \\ &= 10^2 \end{aligned}$$

km hm dam $\overset{\text{g}}{\text{m}}$ dm cm mm
 0.035 35 35 350

Ex.2 Evaluate. Express your answers as simplified rationals.
(vs. simplify)

a) 6^{-2}

$$= \left(\frac{1}{6}\right)^2$$

$$= \frac{1}{6^2}$$

$$= \frac{1}{36}$$

b) $(-4)^{-2}$

$$= \left(\frac{1}{-4}\right)^2$$

$$= \frac{(1)^2}{(-4)^2}$$

$$= \frac{1}{16}$$

c) -4^{-2}

$$= -\left(\frac{1}{4}\right)^2$$

$$= -\frac{(1)^2}{(4)^2}$$

$$= -\frac{1}{16}$$

d) $\left(\frac{3}{4}\right)^{-2}$

$$= \left(\frac{4}{3}\right)^2 \text{ or } \left(\frac{1}{\frac{3}{4}}\right)^2$$

$$= \frac{16}{9} = \left(1 \div \frac{3}{4}\right)^2$$

$$= \left(1 \times \frac{4}{3}\right)^2$$

$$= \left(\frac{4}{3}\right)^2$$

e) $\frac{(5^{-4})(5^{-2})}{(5^{-3})}$

$$= 5^{-4+(-2)-(-3)}$$

$$= 5^{-4-2+3}$$

$$= 5^{-3}$$

$$= \left(\frac{1}{5}\right)^3$$

$$= \frac{1}{125}$$

f) $\frac{(8^{-4})(2^3)}{(16^{-2})}$

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

$$= \frac{2^{-12} \cdot 2^3}{2^{-8}}$$

$$= 2^{-12+3-(-8)}$$

$$= 2^{-1}$$

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

Extra Practice (you try)

g) $2^5(-10)^{-2}$

$$= 32 \left(\frac{1}{-10}\right)^2$$

$$= \frac{32}{100}$$

$$= \frac{8}{25}$$

h) $15^{-4} \times \left(\frac{15^2}{15^8}\right)^{-1}$

$$= 15^{-4} \times \frac{15^8}{15^2}$$

$$= 15^{-4+8-2}$$

$$= 15^2$$

$$= 225$$

i) $(3^0 + 3^2)^{-1}$

$$= (1+9)^{-1}$$

$$= 10^{-1}$$

$$= \frac{1}{10}$$

j) $\frac{4^5}{2^{-3}} \times \frac{2^{-1}}{4^3}$

$$= 4^5 \cdot 2^3 \times \frac{1}{2^1 \cdot 4^3}$$

$$= 4^{5-3} \times 2^{3-1}$$

$$= 4^2 \cdot 2^2$$

$$= 16 \cdot 4$$

$$= 64$$

Are there any Homework Questions you would like to see on the board?

Last day's work: p. 204 #1 – 9

Recall: $(-2)^4$ vs -2^4

$$\begin{aligned} &= (-2)(-2)(-2)(-2) \\ &= 16 \end{aligned}$$

$$\begin{aligned} &= -(2)(2)(2)(2) \\ &= -16 \end{aligned}$$

READ p.221

Today's Homework Practice includes:

pp. 221-223 #(1 – 9)ace, 11b, 13ace**gi**, 16ace