

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. 212 #1 – 10

4.2 Working with Integer Exponents

Date: Oct. 27/15

Ex. 1: Simplify.

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

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

$$= 5^7 \quad \begin{array}{l} (5)(5)(5) \quad (5)(5)(5)(5) \\ \hline = 5^7 \end{array}$$

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

$$= 13^{6-2}$$
$$= 13^4$$

$$\frac{13 \cdot 13 \cdot 13 \cdot 13 \cdot 13 \cdot 13}{13 \cdot 13} = 6^{3 \times 4}$$
$$= 6^{12}$$

c) $(6^3)^4$

$$= 6^{3 \times 4}$$
$$= 6^{12}$$

$$(6 \cdot 6 \cdot 6)(6 \cdot 6 \cdot 6)(6 \cdot 6 \cdot 6)(6 \cdot 6 \cdot 6)$$

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

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

$$= 3^0$$

$$\therefore 3^0 = 1$$

$$b^0 = 1$$

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

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

$$= 5^{-2}$$

$$= \frac{1}{5^2}$$

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



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	10^0
decimetre	dm	0.1	10^{-1}
centimetre	cm	0.01	10^{-2}
millimetre	mm	0.001	10^{-3}
micrometre	μm	0.000 1	10^{-4}
nanometre	nm	0.000 01	10^{-7}
picometre	pm	0.000 001	10^{-12}
femtometre	fm	0.000 000 001	10^{-15}
attometre	am	0.000 000 000 001	10^{-18}

Handwritten notes:

$$10^3 \div 10^1 = 10^{3-1} = 10^2$$

$$10^{-1} \div 10^{-2} = 10^{-1-(-2)} = 10^{-1+2} = 10^1 = \frac{1}{10}$$

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

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

or

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

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

$$= 5^{-4+(-2)-(-3)} = 5^{-4-2+3} = 5^{-3} = \frac{1}{5^3} = \frac{1}{125}$$

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

$$= \frac{(2^3)^{-4}(2^3)}{(2^4)^{-2}} = \frac{2^{-12} \cdot 2^3}{2^{-8}} = 2^{-12+3-(-8)} = 2^{-9+8} = 2^{-1} = \frac{1}{2}$$

Extra Practice (you try)

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

$$= 2^5 \left(\frac{1}{(-10)^2}\right) = \frac{32}{100} = \frac{8}{25}$$

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

$$= 15^{-4} \times (15^{-6})^{-1} = 15^{-4} \times 15^6 = 15^{-4+6} = 15^2 = 225$$

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

$$= (1+9)^{-1} = 10^{-1} = \frac{1}{10}$$

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

$$= 4^{5-3} \times 2^{-1-(-3)} = 4^2 \cdot 2^2 = 16 \cdot 4 = 64$$

$$\begin{aligned} & (-2)^4 \\ &= (-2)(-2)(-2)(-2) \\ &= 16 \end{aligned}$$

$$\begin{aligned} & -2^4 \\ &= -2 \cdot 2 \cdot 2 \cdot 2 \\ &= -16 \end{aligned}$$

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

$$(ab)^n \\ = a^n b^n$$

Last day's work: p. 212 #1 – 10

READ p.221

Today's Homework Practice includes:

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