

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

pp. 399-401 # 1 – 3, 5 – 11, 14, 16, 17

Today's Learning Goal(s):

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

- a) Evaluate numerical expressions involving integer exponents.
- b) Evaluate "zero" exponents.

Develop Zero and Negative (From patterning)

$$\begin{array}{lcl}
 5^4 \div 5^1 & & \\
 = 5^{4-1} & = & 625 \div 5 \\
 = 5^3 & = & 125 \\
 \hline
 5^3 \div 5^1 & = & 125 \div 5 \\
 = 5^{3-1} & = & 25 \\
 = 5^2 & \swarrow & \\
 5^2 \div 5 & & \\
 = 5^{2-1} & = & 25 \div 5 \\
 = 5^1 & = & 5
 \end{array}$$

$$\begin{array}{lcl}
 5^1 \div 5^1 & 5 \div 5 & \\
 = 5^{1-1} & = & 1 \\
 = 5^0 & \swarrow &
 \end{array}$$

$$\begin{array}{lcl}
 5^0 \div 5^1 & 1 \div 5 & \\
 = 5^{0-1} & = & \frac{1}{5} \\
 = 5^{-1} & \swarrow &
 \end{array}$$

$$\begin{array}{lcl}
 5^{-1} \div 5^1 & \frac{1}{5} \div 5 & \\
 = 5^{-1-1} & = & \frac{1}{5} \times \frac{1}{5} \\
 = 5^{-2} & = & \frac{1}{25} \text{ or } \frac{1}{5^2}
 \end{array}$$

Summary

$$\begin{array}{lcl}
 b^0 & ; b \neq 0 & \left| \quad b^{-n} \quad ; b \neq 0 \quad \left| \quad \left(\frac{a}{b}\right)^{-n} \quad \begin{array}{l} a \neq 0 \\ b \neq 0 \end{array} \right. \\
 = 1 & & \left| \quad = \left(\frac{1}{b}\right)^n \quad \left| \quad = \left(\frac{b}{a}\right)^n
 \end{array}$$

MCF 3MI

7.3 Working with Integer Exponents

Date: May 14/18

Ex. 1: Evaluate.

a) $2^0 = 1$ b) $(-11)^0 = 1$ c) $(-3)^2 = (-3)(-3) = 9$ d) $-3^2 = -(3)(3) = -9$ e) $\frac{6^4}{(6^2)^2} = \frac{6^4}{6^{2 \times 2}} = \frac{6^4}{6^4} = 6^{4-4} = 6^0 = 1$ f) $4^{-2} = \left(\frac{1}{4}\right)^2 = \frac{(1)^2}{(4)^2} = \frac{1}{16}$

g) $(-3)^{-3} = \left(-\frac{1}{3}\right)^3 = \frac{(-1)^3}{(3)^3} = \frac{-1}{27}$ h) $(-3)^{-4} = \left(-\frac{1}{3}\right)^4 = \frac{(-1)^4}{(3)^4} = \frac{1}{81}$ i) $\left(\frac{2}{3}\right)^{-3} = \left(\frac{3}{2}\right)^3 = \frac{3^3}{2^3} = \frac{27}{8}$ j) $\left(\frac{-2}{3}\right)^{-3} = \left(\frac{3}{-2}\right)^3 = \frac{3^3}{(-2)^3} = \frac{27}{-8}$ k) $2^{-3} \times 2^7 = 2^{-3+7} = 2^4 = 16$

l) $\frac{9^{-1}(9^{-7})}{(9^{-3})^2}$

$$= \frac{9^{-1+(-7)}}{9^{-3 \times 2}}$$

$$= \frac{9^{-8}}{9^{-6}}$$

$$= 9^{-8-(-6)}$$

$$= 9^{-8+6}$$

$$= 9^{-2}$$

$$\begin{aligned} &\rightarrow 9^{-2} \\ &= \left(\frac{1}{9}\right)^2 \\ &= \frac{1}{81} \end{aligned}$$

m) $\frac{a^{-2}b^{-3}c^4d^5}{e^6f^7g^{-8}h^{-9}}$

$$= \frac{c^4d^5g^8h^9}{e^6f^7a^2b^3}$$

Ex. 2: Rewrite each expression as an equivalent expression with a positive exponent.
DO NOT EVALUATE.

a) 3^{-2} b) $\left(\frac{8}{3}\right)^{-11}$ c) $(-4)^{-2}$ d) $\frac{x^6}{x^9}$ e) $x^{10}y^{14} \div x^2y^{20}$

$= \left(\frac{1}{3}\right)^2$
 $= \left(\frac{3}{8}\right)^{11}$
 $= \left(\frac{1}{-4}\right)^2$
 $= x^{6-9}$
 $= x^{-3}$
 $= x^{10-2} y^{14-20}$
 $= \left(\frac{1}{x}\right)^3$
 $= x^8 y^{-6}$
 $= x^8 \left(\frac{1}{y}\right)^6$
 $= \frac{x^8}{y^6}$

Summary

b^0	$; b \neq 0$	b^{-n}	$; b \neq 0$	$\left(\frac{a}{b}\right)^{-n}$	$a \neq 0$	$b \neq 0$
$= 1$		$= \left(\frac{1}{b}\right)^n$		$= \left(\frac{b}{a}\right)^n$		

Today's Homework:

Read p.407

pp. 407-409 # 1 – 9, 11, 12

SWYK Wednesday