

# MPM 1DI Unit 2

## Polynomials

(Chapter 3 in Textbook!)

### Day 3 - Exponent Laws II

## Exponent Laws

Simplifying Exponential Equations: Power of a Power

Expression	Expanded Form	Single Power
$(4^2)^3$	$(4 \times 4)(4 \times 4)(4 \times 4)$	$4^6$
$(5^3)^2$	$(5 \times 5 \times 5)(5 \times 5 \times 5)$	$5^6$
$(x^4)^2$	$(x \cdot x \cdot x \cdot x)(x \cdot x \cdot x \cdot x)$	$x^8$
$(y^3)^4$	$(y \cdot y \cdot y)(y \cdot y \cdot y)(y \cdot y \cdot y)(y \cdot y \cdot y)$	$y^{12}$

Generalized Rule: Power Rule

$$(x^a)^b = x^{a \times b}$$

we keep the base  
same and multiply the  
exponents

Working With Exponent Laws (using all three laws)

Simplify:

1. a)  $(x^5)^2 = x^{10}$       b)  $(10b^2)^3 = 10^3 b^6 = 1000b^6$       c)  $[(x^3)(x^2)]^3 = [x^5]^3 = x^{15}$

d)  $-4ab^2 \div 2ab = \frac{-4\cancel{a}b^2}{2\cancel{a}b} = -2b$        $a^0 = 1$

e)  $\frac{(7mn^2)^3}{7mn} = \frac{49m^2n^4}{7mn} = 7mn^3$       f)  $(-3x^5y^4)^2 = 9x^{10}y^8$

g)  $\left(\frac{x^5}{-3y^2}\right)^3 = \frac{x^{15}}{9y^6}$        $-3^2 = -3 \times -3$

Simplify and Evaluate

1.  $(3x^2y)^2$  for  $x = 2, y = 3$   
 $= 9x^4y^2 = 9(2^4)(3^2) = 9(16)(9) = 1296$

$$\begin{array}{r} 5 \\ 16 \\ \times 9 \\ \hline 3 \quad 3 \\ 144 \\ \times \quad 9 \\ \hline 1296 \end{array}$$

2.  $\frac{(-3a^3)^2}{5a^3}$  for  $a = 3$   
 $= \frac{9a^6}{5a^3} = 1.8 \cdot a^3 = 1.8 \cdot 3^3 = 1.8 \cdot 27$

Scientific Notation

3 100 000 written in scientific notation is:

$$3.1 \times 10^6$$

Simplify:

$$(3 \times 10^9)(2.0 \times 10^5)$$

$$= 6 \cdot 10^{14}$$

$$= 600\,000\,000\,000\,000.$$