Properties of Exponents

Section 8.1

Exponents

- Exponents are a short hand way to write multiplication

- Examples:
  - $4 \cdot 4 = 4^2$
  - $4 \cdot 4 \cdot 4 = 4^3$
  - $4 \cdot 4 \cdot x \cdot x \cdot x = 4^2 x^3 = 16\, x^3$

Properties

- $a^m \cdot a^n = a^{m+n}$

- Examples:

Properties

- $(a^m)^n = a^{mn}$

- Examples:

- $(ab)^m = a^m b^m$

- Examples:

Exponents & Negative numbers

- When negative numbers are raised to an exponent, the following rules hold true:
  - If the exponent is odd- the answer is negative
  - If the exponent is even- the answer is positive
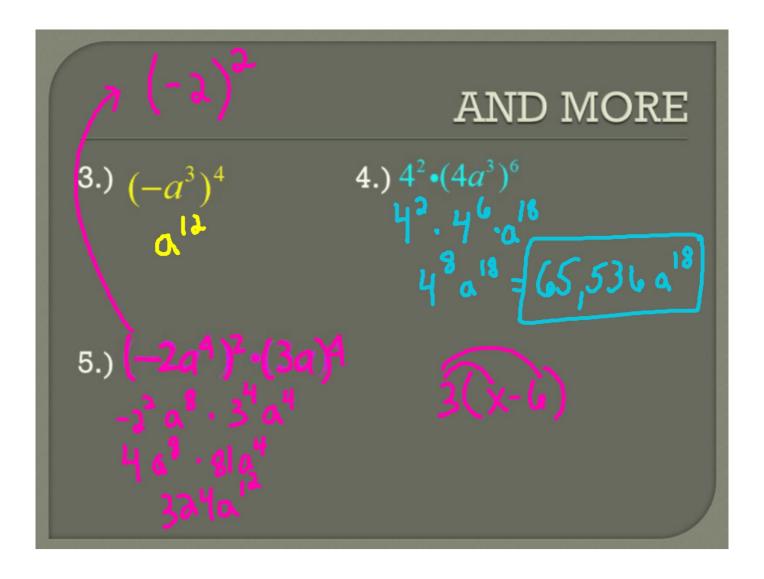- Examples:

CLASSWORK

- Pg 453 # 4-21 odd

$$(a^4)^2 = a^8$$

EXTRA EXAMPLES

1.) $\left[(2x+3)^4\right]^2$

$$(2x+3)^8$$

2.) $2x^2 \cdot (3x)^3$

$$2x^2 \cdot 3^3 x^3$$

$$2x^2 \cdot 27x^3$$

$$54x^5$$

$(-2)^2$

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

a^{12}

4.) $4^2 \cdot (4a^3)^6$

$4^2 \cdot 4^6 \cdot a^{18}$

$4^8 a^{18} = \boxed{65,536 \, a^{18}}$

5.) $(-2a^4)^7 \cdot (3a)^4$

$-2^3 a^8 \cdot 3^4 a^4$

$4a^8 \cdot 81a^4$

$324a^{12}$

$3(x-6)$

CLASSWORK

- PG 453 # 23- 45 odd

HOMEWORK

- Pg 453 # 4-44 even