Properties of Exponents

Section 8.1

Exponents

- Exponents are a short hand way to write multiplication

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

$x^3 = x \cdot x \cdot x$

$x^4 = x \cdot x \cdot x \cdot x$

Properties

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

- Examples:

① $x^3 \cdot x^4 = x^7$

② $x^3 \cdot x^2 \cdot x^5 = x^{10}$

③ $(3x)(3x)(3x) = (3x)^3$

④ $5 \cdot 5 \cdot 5 \cdot 5 \cdot x \cdot x \cdot y \cdot y \cdot y$

$= 5^4 x^2 y^3$

$= 625 x^2 y^3$

$3(x+5)$

Properties

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

① $(x^3)^4 = x^{12}$

② $(5^2)^3 = 5^6 = 15,625$

Properties

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

- Examples:

① $(x^2y)^3 = \boxed{x^6y^3}$

② $(5^1x^4y^6)^2 = 5^2x^8y^{12}$

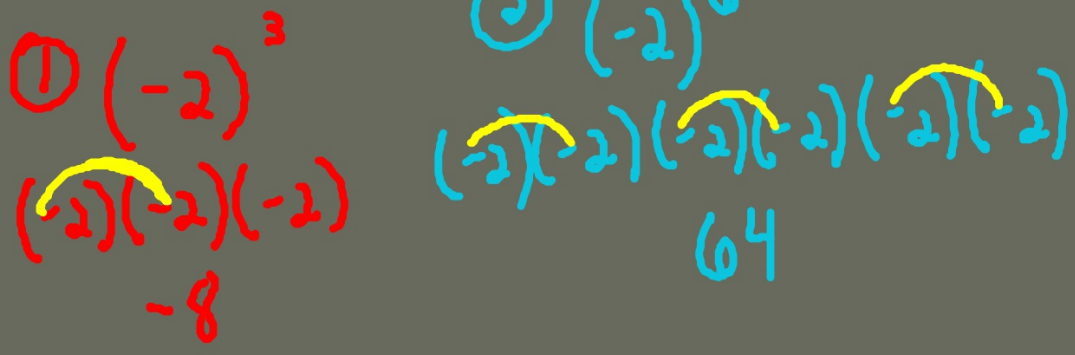
$= \boxed{25x^8y^{12}}$

③ $(-5a^2)^2 = 25a^4$

④ $(-5a^2)^3 = -125a^6$

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

EXTRA EXAMPLES

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

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

AND MORE

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

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

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

CLASSWORK

- PG 453 # 23- 45 odd

HOMEWORK

- Pg 453 # 4-44 even