Exponents Cheat Sheet (Dan's Test Prep)

Review: $a^b = a \cdot a \cdot a \cdot \ldots \cdot a$ (multiply a by itself, b times)

   a is called the "base" and b is called the "exponent"

Example: $3^5 = 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 243$ (multiply 3 by itself, 5 times)

   $(2x)^4 = 2x \cdot 2x \cdot 2x \cdot 2x = 16x^4$ (multiply $2x$ by itself, 4 times)

Must-Know Basics:

Exponent Rule	Algebraic Example	Numeric Example
When multiplying two terms with the same base, add the exponents	$a^b \cdot a^c = a^{(b+c)}$	$2^2 \cdot 2^3 = 2^{(2+3)} = 2^5$
When dividing two terms with the same base, subtract the exponents	$\dfrac{a^b}{a^c} = a^{(b-c)}$	$\dfrac{2^3}{2^2} = 2^{(3-2)} = 2$
When raising a power to another power, multiply the exponents	$(a^b)^c = a^{(bc)}$	$(2^2)^3 = 2^{(2 \cdot 3)} = 2^6$
When raising a product to a power, apply the power to all factors inside	$(ab)^c = a^c b^c$	$(2x)^3 = 2^{(3)}x^3 = 8x^3$
A base with a negative exponent can be flipped to become positive	$a^{-b} = \dfrac{1}{a^b}$ $\dfrac{1}{a^{-b}} = a^b$	$2^{-2} = \dfrac{1}{2^2}$ $\dfrac{5}{2^{-2}} = \dfrac{2^2}{5}$
Anything raised to the 0th power is equivalent to 1	$(abc)^0 = 1$	$(2x^2)^0 = 1$