

EXPONENTS

I. DEALING WITH NEGATIVES

Note 1: Watch where the negative sign really belongs.

Note 2: There's always a 1 multiplying every number. Use it when it helps you.

a) $-x^2 = -1x^2 = -1xx = -1x^2 = -x^2$	a1) $-3^2 = -1 \cdot 3^2 = -1 \cdot 3 \cdot 3 = -1 \cdot 9 = -9$
b) $(-x)^2 = (-x)(-x) = x^2$	b1) $(-3)^2 = (-3)(-3) = 9$

II. MULTIPLYING WITH EXPONENTS

Note 3: When multiplying numbers that have exponents, **add** the exponents.

Note 4: When doing an exponent on an exponent, **multiply** the exponents.

a) $x^3x^4 = x^{3+4} = x^7$	a1) $5^35^4 = 5^{3+4} = 5^7$
b) $(x^3)^4 = x^{3 \cdot 4} = x^{12}$	b1) $(5^3)^4 = 5^{3 \cdot 4} = 5^{12}$
c) $2x^3x^4 = 2x^{3+4} = 2x^7$	
d) <i>Notice in this one there are two variables:</i> $(2x^3y^4)^5 = 2^5x^{3 \cdot 5}y^{4 \cdot 5} = 32x^{15}y^{20}$	

III. DIVIDING WITH EXPONENTS

Note 5: When dividing numbers that have exponents, **subtract** the exponents.

Note 6: Be careful with your **negatives!** Slow down and think carefully about adding/subtracting negative numbers, especially when the "larger" number is negative.

Note 7: **Your final answer must not have negative exponents.**

a) $x^{-3} = \frac{1}{x^3}$
b) $x^3 = \frac{1}{x^{-3}}$ (but this can't be the answer)
c) $\frac{x^7}{x^{-3}} = x^7x^3 = x^{10}$
d) $\frac{x^7}{x^3} = x^7x^{-3} = x^4$

e) $\frac{x^3}{x^7} = x^3x^{-7} = x^{-4}$
f) $\frac{x^7}{x^3} = x^7x^{-3} = x^4$
g) $\frac{12x^3y^5}{18x^6y^4} = \frac{12}{18}x^{3-6}y^{5-4} = \frac{2y}{3x^3}$
by factors: $\frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{xxx}}{\cancel{2} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{xxx} \cdot \cancel{yyy}} = \frac{2y}{3x^3}$