

## Lesson 2: Exponent Laws

Notice:  $x^3 \cdot x^2 = \underbrace{x \cdot x \cdot x}_{x^3} \cdot \underbrace{x \cdot x}_{x^2} = x^5$

$$y^4 \cdot y^1 = y \cdot y \cdot y \cdot y \cdot y = y^5$$

### 1) LAWS

- i)  $x^m \cdot x^n = x^{m+n}$  (multiplication)
- ii)  $x^m \div x^n = x^{m-n}$  (division)
- iii)  $(x^m)^n = x^{m \cdot n}$  (power of a power)
- iv)  $x^0 = 1$  (zero exponent)
- v)  $(xy)^n = x^n y^n$  (power of a product)
- vi)  $\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}$  (power of a quotient)

### 2) EXAMPLES

1. Simplify (Don't evaluate)

a)  $3^2 \times 3^{10} = 3^{12}$

b)  $(x^{10} \div x^3)^2$   
 $= (x^7)^2$   
 $= x^{14}$

c)  $(-2x^{10})^4$   
 $= (-2)^4 (10)^4$   
 $= 8x^{40}$

\*no exponent = 1

