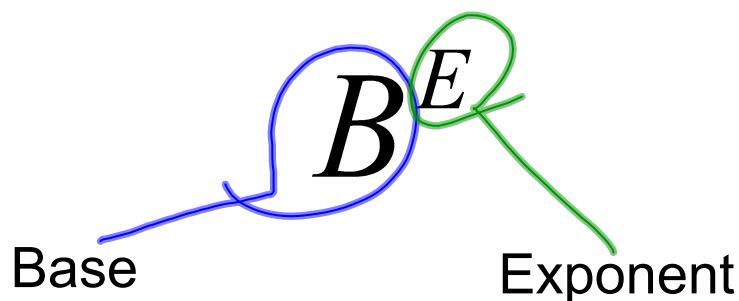


## Section P.2: Exponents and Scientific Notation



The exponent can only be negative in scientific notation.....

Example:  $(-2)^3 \cdot 3^2$

$$\begin{aligned} & (-2)(-2)(-2) \cdot 3(3) \\ & \quad \checkmark \\ & 4(-2) \cdot 9 \\ & -8(9) \\ & \quad \textcircled{-72} \end{aligned}$$

## Properties of Exponents:

$$b^{-n} = \frac{1}{b^n}$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

divide

$$\left(\frac{b^n}{b^m}\right) = b^{n-m}$$

$$b^n \cdot b^m = b^{n+m}$$

$$\underline{b^0 = 1}$$

$$(b^n)^m = b^{nm}$$

$$(ab)^n = a^n b^n$$

power  
to  
power

## Examples:

$$\begin{aligned} & (-3x^4y^5)^3 \\ & (-3)^3 x^{12} y^{15} \\ & -27x^{12}y^{15} \end{aligned}$$

$$\begin{aligned} & (-7xy^4)(-2x^5y^6) \\ & 14x^6y^{10} \end{aligned}$$

$$\begin{aligned} & \frac{-35x^2y^4}{5x^6y^{-8}} \\ & \frac{-7x^{12}}{x^4} \end{aligned}$$

$$\begin{aligned} & \left(\frac{4x^2}{y}\right)^{-3} = \frac{4^{-3}x^{-6}}{y^{-3}} \\ & \frac{y^3}{64x^6} \end{aligned}$$

$$a \times 10^e$$

a must be  $<10$  but  $\geq 1$

Example: write in the other form.

$$2.6 \times 10^7$$

26,000,000

$$4,600,000$$

$$4.6 \times 10^6$$

$$1.016 \times 10^{-8}$$

$$0.00000001016$$

$$0.00023$$

$$2.3 \times 10^{-4}$$

Examples:

$$\frac{5.6 \times 10^{12}}{2.8 \times 10^8}$$

subtract

$$2 \times 10^4$$

$$(5.6 \times 10^{12})(2.8 \times 10^{-8})$$

add

$$15.68 \times 10^4$$

$$1.568 \times 10^1 \times 10^4$$

$$1.568 \times 10^5$$

Example:  $R_s = \frac{2GM}{c^2}$

$R_s$  = Radius of star

$G$  = Gravity constant ( $6.7 \times 10^{-11}$ )

$M$  = Mass of the star(Kg)

$c$  = Speed of light( $3 \times 10^8$  mps)

Find the radius the sun would need to become for it to turn into a black hole.

Sun's mass is about  $2 \times 10^{30}$  Kg

$$\begin{aligned}
 R_s &= \frac{2(2 \times 10^{30})(6.7 \times 10^{-11})}{(3 \times 10^8)^2 \text{ power to power}} \\
 &= \frac{(4 \times 10^{30})(6.7 \times 10^{-11})}{(9 \times 10^{16})} \\
 &= \frac{26.8 \times 10^{19}}{9 \times 10^{16}} \\
 &= 2.9777 \times 10^3 \\
 &\approx 2978 \text{ m}
 \end{aligned}$$

Suggested Homework: Ch P.2  
 pg.20 #'s 14-20e, 38, 48, 56-64e,  
 68, 70, 76, 78, 84, 86, 92