Physics Summer Study Sheet

Kinematics Formulas

MUST BE MEMORIZED

$$v = v_0 + at$$

$$x = x_0 + v_0 t + \frac{1}{2}at^2$$

$$v^2 = v_0^2 + 2a(x - x_0)$$

$$x = x_0 + vt$$

Prefixes

MUST BE MEMORIZED

giga- (G-) 10^9 1 billion

mega- (M-) 10^6 1 million

kilo- (k-) 10^3 1 thousand

deci- (d-) 10^{-1} 1 tenth

centi- (c-) 10^{-2} 1 hundredth

milli- (m-) 10^{-3} 1 thousandth

micro- (μ-) 10^{-6} 1 millionth

nano- (n-) 10^{-9} 1 billionth
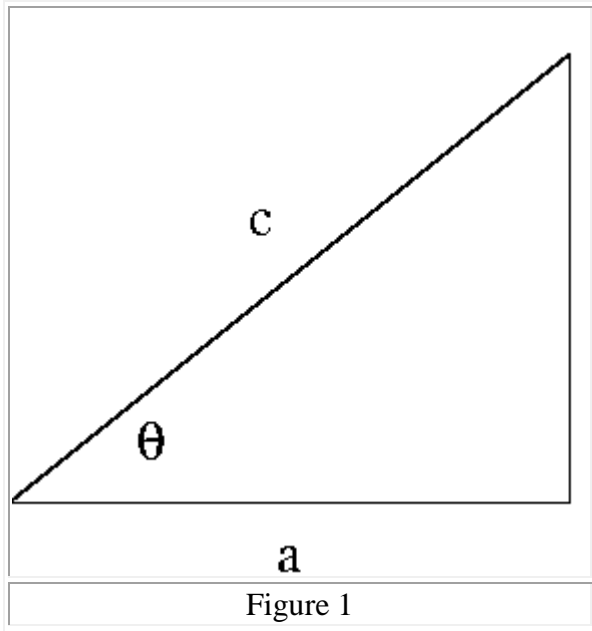
pico- (p-) 10^{-12} 1 trillionth

Special Right Triangles

Degrees	sin	cos	tan
0	$\frac{\sqrt{0}}{2} = 0$	$\frac{\sqrt{4}}{2} = 1$	0
30	$\frac{\sqrt{1}}{2} = \frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
45	$\frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$	$\frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$	1
60	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{1}}{2} = \frac{1}{2}$	$\sqrt{3}$
90	$\frac{\sqrt{4}}{2} = 1$	$\frac{\sqrt{0}}{2} = 0$	∞

Exponent laws

Law	Example
$x^1 = x$	$6^1 = 6$
$x^0 = 1$	$7^0 = 1$
$x^{-1} = 1/x$	$4^{-1} = 1/4$
$x^m x^n = x^{m+n}$	$x^2 x^3 = x^{2+3} = x^5$
$x^m / x^n = x^{m-n}$	$x^6 / x^2 = x^{6-2} = x^4$
$(x^m)^n = x^{mn}$	$(x^2)^3 = x^{2 \times 3} = x^6$
$(xy)^n = x^n y^n$	$(xy)^3 = x^3 y^3$
$(x/y)^n = x^n / y^n$	$(x/y)^2 = x^2 / y^2$
$x^{-n} = 1/x^n$	$x^{-3} = 1/x^3$

$$x^{\frac{m}{n}} = \sqrt[n]{x^m} \qquad x^{\frac{2}{3}} = \sqrt[3]{x^2}$$
$$= \left(\sqrt[n]{x}\right)^m \qquad = \left(\sqrt[3]{x}\right)^2$$

Trigonometry Basics

Figure 1

parallelogram = bh

trapezoid = h/2 (b_1 + b_2)

circle = $pi\, r^2$

b

| **triangle =** | $\frac{1}{2}(bh)$ | | one half times the base length times the height of the triangle |

Circumference of Circle =

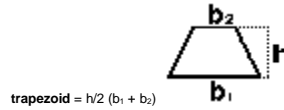**PI x diameter** = 2 PI x radius
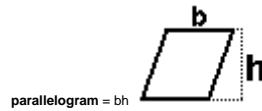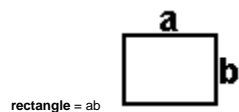
where **PI** = π = **3.141592…**

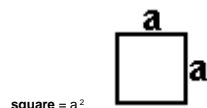For the angle θ pictured in the figure, we see that

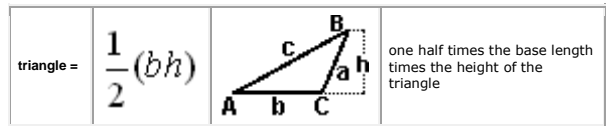$$\sin\theta = \frac{b}{c} = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos\theta = \frac{a}{c} = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan\theta = \frac{b}{a} = \frac{\text{opposite}}{\text{adjacent}}$$

Area formulas

square = a^2

rectangle = ab

What to expect and do to be successful in class.