Physics 200
Semester 1 Formulas, 2017-2018

d=rt [zero acceleration]

Formulas:

$$\Delta x = x - x_0$$

$$v_{x\,Ave.} = \frac{\Delta x}{\Delta t}$$

$$a = \frac{\Delta v}{\Delta t}$$

$$\Delta x = \frac{1}{2}(v_{x0} + v_x)t$$

$$v_x = v_{x0} + at$$

$$\Delta x = v_{x0}\,t + \frac{1}{2}at^2$$

$$v_x{}^2 = v_{0x}{}^2 + 2a(\Delta x)$$
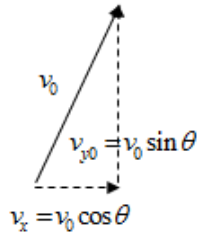
$$\sum F = F_{NET} = ma$$

$$w = mg$$

$$F_f = \mu F_N$$

$$g = 9.8\,\frac{m}{s^2}$$

Good Stuff for Constant Acceleration

$$\Delta x = v_{x0}t + \frac{1}{2}at^2$$

$$\Delta x = \frac{1}{2}(v_{x0} + v_x)t$$

$$v_x = v_{x0} + at$$

$$v_x^2 = v_{x0}^2 + 2a(x - x_0)$$

**During freefall, a = g, and y may be substituted for x.

Good Stuff for Free Fall

$$\Delta y = v_{y0}t - \frac{1}{2}gt^2$$

$$\Delta y = \frac{1}{2}(v_{y0} + v_y)t$$

$$v_y = v_{y0} - gt$$

$$v_y^2 = v_{y0}^2 - 2g(y - y_0)$$

Good Stuff

Resolving into x & y components:

Range formula:

$$Range = \frac{v_0^2 \sin 2\theta}{g}$$

$$v_{y0} = v_0 \sin\theta$$

$$v_x = v_0 \cos\theta$$

Horizontal motion: $x = v_x t = v_0(\cos\theta)t$

Vertical Motion:

$$y = y_0 + v_{y0}t - \frac{1}{2}gt^2 = y_0 + v_0(\sin\theta)t - \frac{1}{2}gt^2$$

$$v_y = v_{y0} - gt = v_0 \sin\theta - gt$$

$a_{centripetal} = v^2/r$ $F_{centripetal} = mv^2/r$ $G = 6.67 \times 10^{-11} Nm^2/kg^2$

$$F_{gravity} = G\left(\frac{M_1 m_1}{r^2}\right) \qquad \frac{T_A^2}{T_B^2} = \frac{r_A^3}{r_B^3} \qquad \text{Circumference} = 2\pi r \qquad w = mg$$

W=Fd $P = \frac{W}{t}$ $W_{net} = \Delta KE$ $KE = \frac{1}{2}mv^2$ $\Delta PE = mgh$

$$KE_{initial} + PE_{initial} = KE_{final} + PE_{final} \qquad\qquad KE_{initial} + PE_{initial} + W_{nc} = KE_{final} + PE_{final}$$

$PE_{spring} = \frac{1}{2}kx^2$ $F_{spring} = kx$