# **Kinematic Formulas**

$$\Delta x = x_f - x_0 \qquad \qquad s = d/t$$

$$s = d/t$$

$$v = \Delta x/t$$

$$a = \Delta v/t$$

$$a = \Delta v/t$$
  $\Delta x = v_0 t + \frac{1}{2}at^2$ 

$$v_i^2 = v_i^2 + 2a \Delta x$$

$$V_f = V_0 + at$$

# Newton's Laws

$$\Sigma F = ma$$

$$F_{fs} = \mu_s F_N$$

$$F_{fk} = \mu_k F_N$$

$$\sum F = ma$$
  $F_{fs} = \mu_s F_N$   $F_{fk} = \mu_k F_N$   $F_{spring} = kx$ 

$$w = F_g = mg$$

# Uniform Circular Motion

$$v = 2\pi r / t$$

$$a_c = v^2/r$$

$$F_c = mv^2/r$$

$$v = 2\pi r/t$$
  $a_c = v^2/r$   $F_c = mv^2/r$   $F_e = Gm_1m_2/r^2$ 

$$G = 6.67 \times 10^{-11} \text{ m}^3 \text{kg}^{-1} \text{s}^{-2}$$

# Work & Energy

$$W = F\Delta x \cos(\Theta)$$
  $W = \Delta E$   $W_s = -\frac{1}{2}kx^2$   $P = W/t$ 

$$W = \Delta E$$

$$W_{x} = -\frac{1}{2}kx^{2}$$

$$P = W/t$$

$$PE = mgh$$

$$KE = \frac{1}{2}mv^2$$

$$EPE = \frac{1}{2}kx^2$$

PE = mgh KE = 
$$\frac{1}{2}$$
mv<sup>2</sup> EPE =  $\frac{1}{2}$ kx<sup>2</sup> Total Work =  $\Delta$ KE

# Momentum

$$p = mv$$

$$I = \Delta p$$

$$v_{1} + v_{1f} = v_{2} + v_{2f}$$

$$I = Ft$$



IT'S NOT THAT I'M SO SMART. IT'S JUST THAT I STAY WITH PROBLEMS LONGER .

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