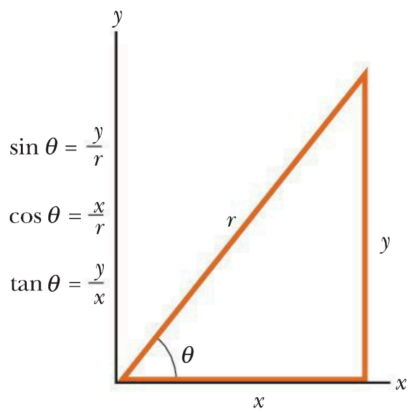Print your name clearly. There are 20 questions on this test, worth 5 points each. There is only one correct answer for each question. Clearly circle your answer.

POTENTIALLY USEFUL INFORMATION (**SOME EQUATIONS ARE ONLY VALID IN SPECIFIC SITUATIONS**):

Conversions: 1 m = 3.281 ft   1 mile = 1609 m   1 kg = 2.2 pounds $g = 9.8 \text{ m/s}^2 = 32 \text{ ft/s}^2$

1 pound = 4.45 N   1 hp = 746 W

$\sin\theta = \frac{y}{r}$

$\cos\theta = \frac{x}{r}$

$\tan\theta = \frac{y}{x}$

$r^2 = x^2 + y^2$

1D or 2D motion:

$$\bar{v} = \frac{\Delta x}{\Delta t} \qquad \bar{a} = \frac{\Delta v}{\Delta t} \qquad v = \lim_{\Delta t \to 0}\frac{\Delta x}{\Delta t} \qquad a = \lim_{\Delta t \to 0}\frac{\Delta v}{\Delta t}$$

$$x = x_o + \bar{v}t = x_o + v_o t + \frac{1}{2}at^2 \qquad\qquad v = v_o + at$$

$$v^2 = v_o^2 + 2a(x - x_o)$$

Quadratic formula:

$$ax^2 + bx + c = 0 \rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\vec{F} = \sum_i \vec{F}_i = m\vec{a} = \frac{\Delta \vec{p}}{\Delta t} \qquad F_g = mg \qquad F_{sp} = -kx \qquad F_s \le \mu_s n \qquad F_k = \mu_k n \qquad \vec{F}_{AB} = -\vec{F}_{BA}$$

$$W = F_x \Delta x = \Delta KE + \Delta PE \qquad KE = \tfrac{1}{2}mv^2 = \frac{p^2}{2m} \qquad PE_g = mgy \qquad PE_{sp} = \tfrac{1}{2}kx^2 \qquad \bar{P} = \frac{W}{\Delta t} = F\bar{v}$$

$$\vec{p} = m\vec{v} \qquad \vec{I} = \vec{F}\Delta t = \Delta \vec{p} = m\Delta\vec{v} \qquad m_1\vec{v}_{1i} + m_2\vec{v}_{2i} = m_1\vec{v}_{1f} + m_2\vec{v}_{2f} \qquad KE_i + PE_i = KE_f + PE_f$$

$$v_f = \frac{m_1 v_{1i} + m_2 v_{2i}}{m_1 + m_2} \qquad v_{1i} - v_{2i} = -(v_{1f} - v_{2f})$$