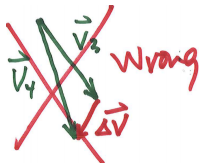
Name: _____ NetID: _____

NYU Physics I—Term Exam 1

Problem 1: (From Problem Set 1, Problem 3) Combine a mass M and a length h and an acceleration g into something that has units of time. You don't have to use all three quantities if you don't need to.

Problem 2: (From Problem Set 2, Problem 3) Make a plot of the velocity v_y against time t for a stone thrown upwards at speed $v_y = +5\,\mathrm{m\,s^{-1}}$. Use as the acceleration due to gravity $a_y = -10\,\mathrm{m\,s^{-2}}$. Plot for the time interval $0 < t < 1\,\mathrm{s}$. Label your axes with sufficient precision that I can check your numbers.

Problem 3: (From Lecture, 2018-09-11) We spent time talking about two vectors, $\vec{v}_3$ and $\vec{v}_4$, which were the velocities of the rock on a no-air-resistance trajectory. What was wrong with this picture, that we drew?



Problem 4: (From Lecture, 2018-09-13) A car is moving at constant speed v along a horizontal, circular path of radius R. Is there a non-zero net force on the car? Why?

Problem 5: (From Lecture, 2017-09-18) We gave three arguments that $g \sin\theta$ was a good guess for the acceleration of a block down an inclined plane. The first argument was that it has the right units! What were the other two arguments? *Hint:* They were limiting cases!

Problem 6: (From recitation, week of 2017-09-10) You made a table of times, accelerations, positions, and velocities. If in the third row you had

$$t_3 = 0.3\,\mathrm{s} \quad a_3 = -10.0\,\mathrm{m\,s^{-2}} \quad v_3 = -2.0\,\mathrm{m\,s^{-1}} \quad x_3 = 9.7\,\mathrm{m} \quad , \qquad (1)$$

then what would you write for v_4 in fourth row, which looks like

$$t_4 = 0.4\,\mathrm{s} \quad a_4 = -10.0\,\mathrm{m\,s^{-2}} \quad v_4 = \_\_\_\,\mathrm{m\,s^{-1}} \quad x_4 = \_\_\_\,\mathrm{m} \quad ? \qquad (2)$$