Midterm 2, version "A" - Physics 2010 - Spring 2014

Name	
Student ID #	

Circle your **TA**

Jake Fish	Rosemary Wulf	Andrew Hess	Clarissa Briner

Circle the **Day** and **Start Time** of your recitation/lab

Section	Tues Wed Thu
	8am 10am 12pm 2pm

Please do not open the exam until you are told to do so. Thanks!

Your exam should have 9 single-sided pages. (You can use the backs for scratch work. We also have spare blank paper up front if you need more scratch paper)

This exam consists of 25 multiple choice questions, each worth the same.
NOTE: One question will be automatically dropped for you!!

Please read and follow the Instructions at the top of the bubble sheet, thanks.

For this exam, please assume $g = 10\ m/s^2$ in all problems, for simplicity!

Check each box as you complete the instructions below:

☐ Print **and** bubble in your name and student ID number on the bubble sheet. (Carefully, please!)

☐ VERY IMPORTANT: Bubble in your Exam version, (this one is version "A"), in the LOWER LEFT of your bubble sheet in the area marked "TEST VERSION"

☐ As you take the exam, mark the correct answer on the bubble sheet. You can circle your answers on the paper copy of the exam for your future reference. But, the bubble sheet always takes precedence over anything written on your exam

Relax! A TA will announce when you can start.

"On my honor, as a University of Colorado at Boulder student, I have neither given nor received unauthorized assistance on this work"

Signature ____

Possibly helpful formula sheet (Exam #2)

For this exam, we will assume g = 10 m/s^2 in all problems, for simplicity!

Average velocity: $\bar{v} = \frac{\Delta x}{\Delta t}$ **Average acceleration:** $\bar{a} = \frac{\Delta v}{\Delta t}$

Equations for motion with constant acceleration :

$$v = v_0 + a\Delta t$$

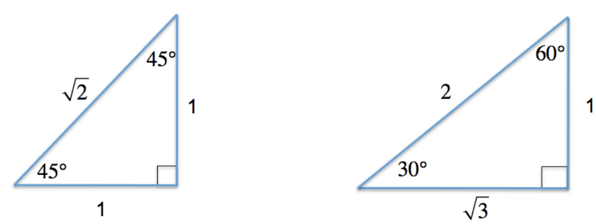
$$x = x_0 + v_0 \Delta t + \frac{1}{2} a \Delta t^2$$

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

$$\bar{v} = \frac{v + v_0}{2}$$

$$x = x_0 + \bar{v}_{average} \Delta t$$

π ~ 3.14
sin(θ) = opposite/hypotenuse
cos(θ) = adjacent/hypotenuse
tan(θ) = opposite/adjacent



Newton's 2nd law: $\vec{F}_{net} = m\,\vec{a}$

Newton's 3rd law: $\vec{F}_{\text{A on B}} = -\vec{F}_{B\text{ on A}}$

Uniform circular motion (radius r, speed v) has acceleration $|\vec{a}_{centripetal}| = v^2 / r$ pointing towards the center of the circle

Newton's universal law of Gravity: $|\vec{F}_{grav}| = G\frac{m_1 m_2}{r^2}$

Kinetic friction is given by $|\vec{F}_{friction,\text{ kinetic}}| = \mu_k N$, where N is the normal force, and static friction has a maximum, so $|F_{friction,\text{ static}}| \le \mu_s N$