PHY 201 Quiz #2 **Name** _____
Score _____

Instructions:
1. Do all of your work on this sheet.
2. **Show all of your steps** in problems for full credit.
3. **Be clear and neat** in your work. Any illegible work, or scribbling in the margins, will not be graded.
4. Place your **answers in a box**.
5. If you need more space, you may use the back of the page and write **On back** in the problem space.

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1. **Multiple Guess (2 pts)** Find the answer which best fits the question and **write it in the space** provided.

a) For projectiles thrown at an angle upward between vertical and horizontal, and considering air resistance to be negligible:
a. The vertical component of the velocity is constant.
b. The acceleration decreases as the projectile moves upward.
c. The speed is smallest at the highest point in its trajectory.
d. The acceleration is zero at the highest point in its trajectory.
e. The velocity is zero at the maximum height.

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b) On Cartesian axes the *x* component of a vector is generally associated with
a. cosine, b. sine, c. tangent, d. none of these.

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2. **Definition/Principle (5 pts)**

a. A particle travels along a circle of radius *r* at speed *v*.
i. What is the magnitude of the acceleration?

ii. What is its direction?

b. On the projectile path below:
i. Carefully draw the velocity vectors at points b and c.
ii. Of the points a, b, c or d, indicate which has the largest speed.

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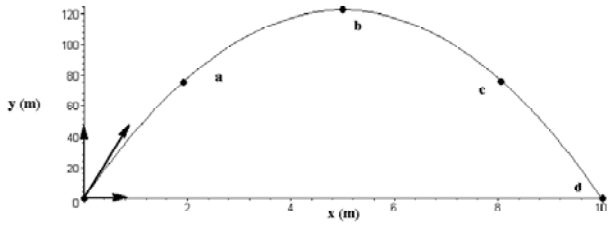
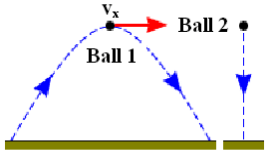


Bonus: Ball 1 is thrown into the air and it follows the path for projectile motion as shown. At the instant it is at the top of its trajectory, Ball 2 is dropped from rest at the same height. Ignoring air resistance, which ball reaches the ground first - Ball 1, Ball 2, or Both? _____



3. **Problems (7 pts)**

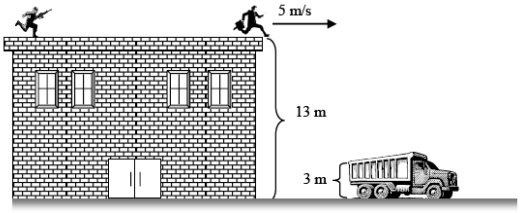
a. Consider $\mathbf{r} = (2.3t^2 - 3.0)\mathbf{i} + (2.1 - 1.2t)\mathbf{j}$ meters with *t* in seconds.

i. Find $\mathbf{v}_{0y}$.

ii. What is the acceleration, **a**?

iii. Find the displacement from $t = 0.0$ to $t = 1.0$.

b. You are being chased across the top of a building as shown below. How far should your accomplice park the truck from the building so that you land on top of truck?



4. **Vectors (7 pts)** Consider the two vectors:
A has magnitude 4.0, oriented 60.0° to the *x*-axis.
B has an *x*-component of 4.0 and a *y*-component of 1.0.

a. Find the *x* and *y* components of **A**.

b. Sketch and label on the axes below: **A**, **B**, and **A+B**.
c. Find the magnitude and direction of **C**=**A**+**B**, analytically.