**Projectiles 1**

1. In order for a moving object to be considered a projectile, what must be true of it?

 a. An airplane is not a projectile for 2 reasons. Name them.

 b. What one assumption do we make about objects that may not be totally true? Is that ok?

2. If I am walking through the room at a constant speed and drop a marker…

 a. Where does it land in relation to me? Why?

 b. Where does it land in relation to the point from which it was dropped? Why?

3. A student drops a coin from the top of a 35 m tall tower

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| a) Sketch the vertical position (y) of the coin as a function of time.yt | b) Sketch the vertical velocity (y) of the coin as a function of time.vyt |
| c) How long does it take for the coin to hit the ground? | d) Sketch the horizontal position (x) of the coin as a function of time.xt |

4. A cannon fires a ball at a speed of 40 m/s horizontally off of the top of the same 35 m tower

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| a) Sketch the vertical position (y) of the cannon ball as a function of time.yt | b) Sketch the vertical velocity (y) of the cannon ball as a function of time.vyt |
| c) How long does it take for the cannon ball to hit the ground? | d) Sketch the horizontal position (x) of the cannon ball as a function of time.xt |
| e) How far away from the base of the tower does the cannon ball land? | b) Sketch the horizontal velocity (x) of the cannon ball as a function of time.vxt |

5. Answer the following questions concerning questions 3 and 4:

 a. How were the vertical components of the coin and cannon ball’s motion similar and different? Why?

 b. How were the horizontal components of the coin and the cannon ball similar and different? Why?

 c. If the coin and the cannon ball were dropped at the same time, which would hit first?