**Projectiles 2**

1. A cannon is fired horizontally from the top of a castle that is 20m tall. It lands in the middle of the enemy formation 120m away. What was the velocity of the cannon?

2. Two bullets are fired from the top of a building that is 50 m tall. The first has an initial horizontal velocity of 100 m/s. The second has an initial horizontal velocity of 150 m/s. How far apart are the two bullets when they land?

3. Bubba Joe fires a rifle in the middle of a flat desert. At the same time, his brother Joe Bubba, drops a bullet from the same height, which falls to the ground in 0.38s. If the rifle has a muzzle velocity of 450 m/s, how far away from Bubba Joe will his bullet land?

5. A cannon fires a cannon ball with an initial velocity of 100 m/s, but instead of being completely horizontal, the velocity is directed at 30° above the horizontal. The ball lands at the same height from which it was fired.

a. What is the acceleration in the x-direction?

b. What is the initial velocity in the x-direction?

c. What is the acceleration in the y-direction?

d. What is the initial velocity in they y- direction?

e. What is the final displacement of the ball in the y-direction?

f. How long is the ball in the air?

g. What is the range of the cannon ball (how far does it travel in the x-direction)?