While on a vacation to Kenya, you visit the port city of Mombassa on the Indian Ocean. On the coast you find an old Portuguese fort probably built in the 16th century. Large stone walls rise vertically from the shore to protect the fort from cannon fire from pirate ships. Walking around on the ramparts, you find the fort's cannons mounted such that they fire horizontally out of holes near the top of the walls facing the ocean. Leaning out of one of these gun holes, you drop a rock which hits the ocean 3.0 seconds later. You wonder how close a pirate ship would have to sail to the fort to be in range of the fort's cannon? Of course you realize that the range depends on the velocity that the cannonball leaves the cannon. That muzzle velocity depends, in turn, on how much gunpowder was loaded into the cannon. (a) Calculate the muzzle velocity necessary to hit a pirate ship 300 meters from the base of the fort. (b) To determine how the muzzle velocity must change to hit ships at different positions, make a graph of horizontal distance traveled by the cannonball (range) before it hits the ocean as a function of muzzle velocity of the cannonball for this fort.