An object is launched from 8 ft high at 42 mph at an angle of 50°.

1. What is the initial velocity in ft per sec?

2. What are the horizontal component $v_x$ and the vertical component $v_y$ of the initial velocity? (Round each to one decimal place.)

3. The upward height and velocity functions are

   \[ h(t) = -16 t^2 + v_y t + h_0 \]

   and

   \[ v_u(t) = v_y - 32 t \]

   What are these functions in this specific case?

4. Solve for the time needed to reach the maximum height, then give the maximum height $M$.

5. What is the time needed to fall from the maximum height to the ground, and what is the total time from launch till impact? (Round each to 3 decimal places).
6. Compute the horizontal length that the object travels.

7. Find the downward velocity component at the time of impact.  
   (Round to one decimal place.)

8. What is the object's total impact speed?  Give answer in ft/sec and in mph.