Exam 1 review problem

Name: _____

1. A car has an initial velocity of 25 m/s to the right and an acceleration of zero. Determine how far it will travel in 3.0 seconds. Determine the final velocity of the car.
    a. Draw a diagram
    b. Find the givens
    c. Describe your approach
    d. Solve
    e. assess

2. A boy throws a ball straight up with an initial velocity of 14.7 m/s. Determine how long it's in the air before it comes back to its original height. What is the velocity at this point?
    a. Draw a diagram
    b. Find the givens
    c. Describe your approach
    d. Solve the problem
    e. Assess

3. A daredevil wants to jump seven school busses parked in a row on her BMX bike. Using some pre-built ramps she'll need to travel 75 m horizontally from the top of one ramp to the next in order to clear the busses. She's got a ramp on the other side she can land on. It's important that she land right at the start of her landing ramp or she'll seriously injure herself. The pre-built take-off ramp has an angle of 30 degrees to the horizontal.
    a. Draw a diagram that represents the above description
    b. Can you help her figure out the necessary take off speed? Hint: use your results and information from problems 1 and 2 above.
    c. Write down your givens and check that the initial velocity you determined in part b will actually fit all the requirements given in the problem statement.
    d. Is this initial speed (velocity) possible on a BMX bike?
    e. Create a set up that you think will allow the daredevil to successfully make this jump using the equipment that she has plus additional materials that you'll design and build for her.

$x_f = x_i + v_{xi}\Delta t + \frac{1}{2} a_x(\Delta t)^2$ $v_{xf} = v_{xi} + a_x\Delta t$ $v_{xf}^2 = v_{xi}^2 + 2a_x(\Delta x)$

$\sin\theta$ = opp/hyp $\cos\theta$ = adj/hyp $\tan\theta$ = opp/adj $a^2 + b^2 = c^2$

1609 meters = 1 mile 3600 seconds = 1 hour