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. If she did her physics correctly, she needs to take off at 29 m/s.
   a. Draw a diagram that represents the above description
   b. Can you help her check 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 θ = opp/hyp   cos θ = adj/hyp   tan θ = opp/adj
$a^2 + b^2 = c^2$ 1609 meters = 1 mile   3600 seconds = 1 hour