1. The following graphs show the motion of a toy car along a straight track. For each situation describe the motion and complete and sketch the missing graph.



- 2. The phrases "slows down" and "decreases velocity" do not have identical physical meaning. Describe each of the following physical situations using the appropriate phrase. When both are appropriate indicate this, when neither are appropriate indicate this also.
 - (a) An object increasing its speed traveling in the negative direction "decreases velocity"
 - (b) An object decreasing its speed traveling in the positive direction "slows down" and "decreases velocity"
 - (c) An object increasing its speed traveling in the positive direction neither phrase
 - (d) An object decreasing its speed traveling in the negative direction. "slows down"

- 3. A ball is dropped from above the ground and bounces several times before coming to rest. Assuming the ground is the origin and the positive direction is upwards sketch graphs of
 - (a) position vs. time



(b) velocity vs. time



(c) acceleration vs. time



- 4. A student travels 12 miles to Evergreen and the trip takes 15 minutes. When she arrives she hears on the radio that a snow storm is about to hit Olympia so she decides to head back home hoping to miss the worst of the storm. Unfortunately she gets caught in the storm and averages a measly 10 miles per hour on the return trip.
 - (a) What is the average speed in miles per hour on the way to college? The average speed is $\bar{s} = d/t = 12$ miles/0.25 hours = 48 mi/hr
 - (b) How long does the return trip take? $\bar{s} = d/t$ so $t = d/\bar{s}$. Thus t = 12/10 = 1.2 hours for the return trip.
 - (c) What is the average speed for the round trip? The average speed is total distance over total time which is 24/1.45=16.6 mi/hr. Notice the average speed is not the average of the speed on the two legs of the trips (29 mi/hr) since the car spends more time going at the slower speed of 10 mi/hr.
 - (d) What is the average velocity for the round trip? Since the car returns to the starting point the displacement is zero so the average velocity is zero.