Date: _____   Acceleration Worksheet   Name: _____
Review #1

Equations:

$$\bar{a} = \frac{\Delta \bar{v}}{\Delta t} \qquad\qquad \Delta \bar{v} = \bar{a}\Delta t \qquad\qquad \Delta t = \frac{\Delta \bar{v}}{\bar{a}}$$

$$\Delta \bar{v} = v_f - v_i \qquad\qquad \bar{v}_{av} = \frac{\bar{d}}{\Delta t} \qquad\qquad \bar{v}_{av} = \frac{\bar{v}_i + \bar{v}_f}{2}$$

Problems: In order to receive credit for this worksheet you MUST show your work. You can use a calculator but you must show all of the steps in the spaces provided.

1. A roller coaster car rapidly picks up speed as it rolls down a slope. As it starts down the slope, its speed is 4 m/s. But 3 seconds later, at the bottom of the slope, its speed is 22 m/s. What is its average acceleration?

$$\Delta v = v_f - v_i = 22 \, ^m/_s - 4 \, ^m/_s = 18 \, ^m/_s$$

$$a = \frac{\Delta v}{\Delta t} = \frac{18 \, ^m/_s}{3s} = 6.0 \, ^m/_{s^2} \, [forward]$$

2. A cyclist accelerates from 0 m/s to 8 m/s in 3 seconds. What is his acceleration ? Is this acceleration higher than that of a car which accelerates from 0 to 30 m/s in 8 seconds?

Car #1
$$\Delta v \qquad 8 \, m/$$

Car #2
$$a = \frac{\Delta v}{\Delta t} = \frac{30 \, ^m/_s}{8s} = 3.75 \, ^m/_{s^2} \, [forward]$$

No car #2s acceleration is greater

3. A car advertisement states that a certain car can accelerate from rest to 70 km/h in 7 seconds. Find the car's average acceleration.

$$\frac{70 \, km}{h} \times \frac{1h}{3600s} \times \frac{1000m}{1km} = 19.44 \, ^m/_s$$

$$a = \frac{\Delta v}{\Delta t} = \frac{19.44 \, ^m/_s}{7s} = 2.8 \, ^m/_{s^2} \, [forward]$$

4. A lizard accelerates from 2 m/s to 10 m/s in 4 seconds. What is the lizard's average acceleration?

$$\Delta v = v_f - v_i = 10 \, ^m/_s - 2 \, ^m/_s = 8 \, ^m/_s$$

$$a = \frac{\Delta v}{\Delta t} = \frac{8 \, ^m/_s}{4s} = 2.0 \, ^m/_{s^2} \, [forward]$$