Date: _____ Acceleration Worksheet Review #1 Name: _____

Equations:

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

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

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

$$a = \frac{\Delta v}{\Delta t} = \frac{8\ ^m/_s}{3s} = 2.7\ ^m/_{s^2}\ [forward]$$

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?

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

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