PHYSICS UNIT 1
PRACTICE PROBLEMS

Pd 7

1. A race car's velocity increases from 4 m/s to 88 m/s over a 4 sec time interval.
   a. What is its average acceleration?

   b. How far does the car travel during this time?

2. The car in problem #1 decelerates from 88 m/s to 20 m/s in 3 sec.
   a. What is its average acceleration?

   b. Over what distance does it travel during this time?

3. A car accelerates from rest at 7 m/s^2 to a velocity of 50 m/s.
   a. How long does it take?

   b. How far does the car travel in this time?

4. A bike rider accelerates uniformly at 2.4 m/s^2 to a velocity of 13 m/s. If the bike moved 14 m during this acceleration, calculate the bike's initial velocity.

5. A drag racer accelerates uniformly from rest, traveling 400 meters in 6.5 seconds. What is the car's average and final velocity?

6. An airplane starts from rest and accelerates at a constant 3.0 m/s^2 for 30 seconds before leaving the ground.

a. How far did it move?

$\Delta s = v_i \Delta t + \frac{1}{2} a (\Delta t)^2 \rightarrow \left(\frac{1}{2}\right)(3.0)(900)$

$\Delta s = 1350\ m$

b. How fast was it moving when it took off?

$v_f^2 = 2(a)(\Delta s)$

$v_f^2 = 2(3.0)(1350)$

$v_f = 284.6\ m/s$

7. A rock takes 7.5 sec to fall from a height to the ground.

a. Calculate the distance it fell.

b. Calculate its final velocity just before it lands.

8. A brick is dropped from a high scaffold.

a. What is its velocity after 4.0 seconds?

b. How far does the brick fall during this time?