Review Problems

5. $W = mg$

$500\,N = m(10\,m/s^2)$

$m = 50\,kg$

on Jupiter:

$W = (50\,kg)(26\,m/s^2)$

$= 1300\,N$

6. $300\,lb \times \frac{1\,kg}{2.20\,lb} = 1360\,kg$

$W = (1360\,kg)(10\,m/s^2)$

$= 13{,}600\,N$

7. $s = \frac{d}{t} = \frac{528\,m}{4\,s} = 132\,m/s$

8. $d = st = (96\,m/s)(17\,s)$

$= 1632\,m$

9. $t = \frac{d}{s}$

Convert units first:

$450\,km \times \frac{1000\,m}{1\,km} = 450{,}000\,m$

$t = \frac{450{,}000\,m}{120\,m/s} = 3750\,s$

10. $a = \frac{v_f - v_i}{t} = \frac{26\,m/s - 10\,m/s}{2s} = 8\,m/s^2$

11. $v_f = v_i + at$

$44\,km/hr = 0 + 5\,km/hr^2 \cdot t$

$44\,km/hr = 5\,km/hr^2 \cdot t$

$t = 8.8\,hr$

12. $v_f = v_i + at$ * units must match

first convert units:

$\frac{5.00\,mi}{1\,hr} \times \frac{1\,km}{.621\,mi} \times \frac{1000\,m}{1\,km} \times \frac{1\,hr}{3600\,s} = 2.24\,m/s$

$v_f = 2.24\,m/s + (3.0\,m/s)(4.00\,s)$

$v_f = 14.2\,m/s$

13. $v_f = v_i + at$

$v_f = 0 + (10\ m/s^2)(1.50\ s)$

$= 15\ m/s$

14. $v_f = 35.8\ m/s + (-10\ m/s^2)(2.50\ s)$

$= 10.8\ m/s$

When it runs out of speed

$0 = 35.8\ m/s + (-10\ m/s^2)t$

$-35.8\ m/s = -10\ m/s^2 \cdot t$

$t = 3.58\ s$

$d = v_0 t + \frac{1}{2} a t^2$

$d = (35.8\ m/s)(3.58\ s) + \frac{1}{2}(-10\ m/s^2)(3.58\ s)^2$

$d = 64.1\ m$

Physics

Review Sheet

Chapter 3 & 4

Equations:

W (weight) = mass x gravity (w = mg)

Average speed= $\frac{total\ distance}{total\ time}$

Acceleration = $\frac{vf-vl}{\Delta t}$ $v_f = v_i + at$

$d = v_0t - \frac{1}{2}at^2$

1. Define:

   Friction, inertia, Newton's First Law, mass, weight, newton, speed, velocity, free fall

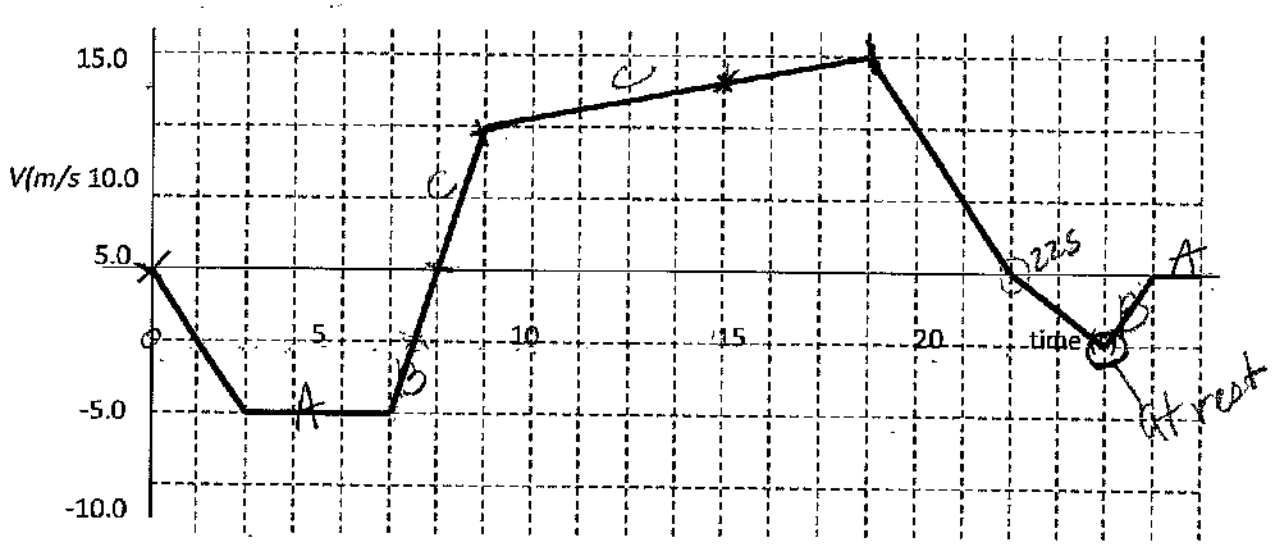
2. Describe the difference between speed and velocity.
3. Describe how an object can be accelerating even though it is travelling at a constant speed.
4. Describe the difference between mass and weight. What are units of weight?

Problems:

5. If a woman weighs 500 N on Earth, what will she weigh on Jupiter, where the acceleration due to gravity is 26 m/s^2?
6. An automobile has a weight of about 3000 pounds. What is its mass in kilograms? What is its weight in newtons?
7. What is the speed of a jet plane that travels 528 meters in 4 seconds?
8. After an impact involving a non-functioning satellite, a paint chip leaves the surface of the satellite at a speed of 96 m/s. After 17 seconds, how far has the chip landed?
9. How many seconds will it take for a satellite to travel 450 km at a rate of 120 m/s?
10. A roller coasters velocity at the top of the hill is 10 m/s. Two seconds later it reaches the bottom of the hill with a velocity of 26m/s. What is the acceleration of the coaster?
11. How long will it take a car to go from 0 to 44 km/hr if they are accelerating at 5 km/hr^2?
12. Billy Bob's four-wheeler will accelerate at 3.0m/s/s. If Billy Bob starts at 5.00mi/h what will be his final speed after 4.00s?

13. A penny dropped into a wishing well reaches the bottom in 1.50 seconds. What was the velocity on impact?
14. A pitcher threw a baseball straight up at 35.8 m/s. What was the velocity after 2.50 seconds? How long will it take the baseball to run out of speed? How high is the ball when it runs out of speed?

1. The graph below describes the motion of a fly that starts out going right.



a. Identify section(s) where the fly moves with constant velocity. – labeled A on graph

b. Identify section(s) where the fly moves right slowing down. – B on graph

c. Identify section(s) where the fly moves left speeding up. C on graph

d. When is the fly at rest? on graph

e. What is the average velocity of the fly between 0 and 15 seconds?
$\frac{13.5\,m/s + 5\,m/s}{2} = \frac{18.5\,m/s}{2} = 9.25\,m/s$

f. What is the **distance** traveled by the fly in this time interval? $d = (9.25\,m/s)(15s) = 139\,m$

g. What is the average **speed** of the fly in the same time interval? $9.25\,m/s$

h. What is the average acceleration of the fly in this time interval? $a = \frac{13.5\,m/s - 5\,m/s}{15s} = .56\,m/s^2$

i. What is the total displacement of the fly from 0 to 22 seconds?
Total displacement = 0

j. Identify the times when the fly changes direction.

7.5s & 22s