Space Shuttle Endeavor - Last Flight

Time	Altitude (meters)	Speed (m/s)
0	0	0
1	3	5
2	7	12
3	17	17
4	42	24
5	69	30
6	94	36
7	134	42
8	186	50
9	247	59
10	283	63
11	334	69
12	429	79
13	523	87
14	614	95
15	665	100
16	755	106
17	888	117
18	1019	126
19	1158	136
20	1334	148

The final launch of NASA's space shuttle Endeavor (STS-134) occurred on May 16, 2011 at 8:56:28 a.m. EDT from launch pad 39A. The image above was taken 17 seconds after launch. See the launch video on YouTube at **http://www.youtube.com/watch?v=ShRa2RG2KDI**

This historic flight was watched by millions of people world-wide. The table above shows the speed and altitude data for the first 20 seconds after launch. The combined fuel tanks and Orbiter had a mass of 2,052,443 kg at launch. The launch gantry had a height of 106 meters.

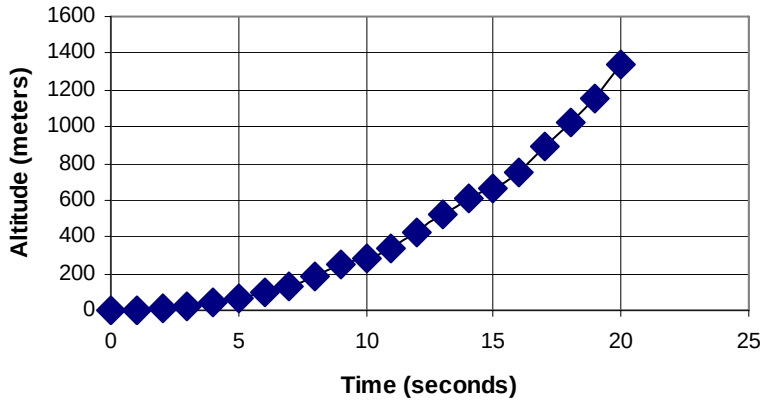
Problem 1 - Plot the altitude of Endeavor Shuttle versus time during the first 20 seconds of launch.

Problem 2 - Plot the speed of the Endeavor Shuttle versus time during the first 20 seconds of launch.

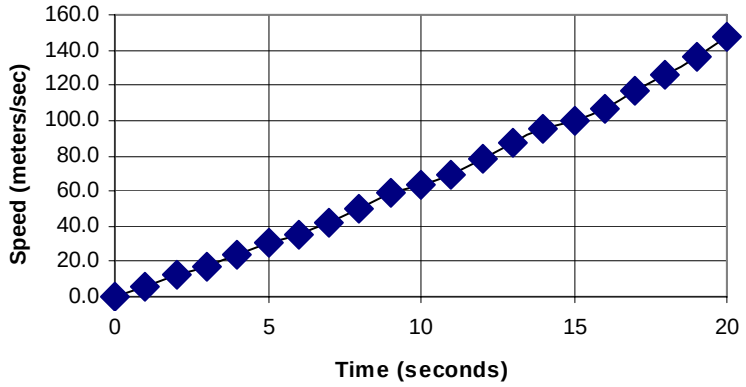
Problem 3 - About what is the speed of the Shuttle when it clears the gantry in A) meters/sec/ B) miles per hour?

Problem 4 - What is the average acceleration of the shuttle during its first 20 seconds of flight?

Problem 1 - Plot the altitude of Endeavor Shuttle versus time during the first 20 seconds of launch.



Problem 2 - Plot the speed of the Endeavor Shuttle versus time during the first 20 seconds of launch.



Problem 3 - About what is the speed of the Shuttle when it clears the gantry in A) meters/sec/ B) miles per hour?
Answer: A) The gantry height is 106 meters, so from Problem 1, we estimate that this speed occurred about 6 seconds after launch. The speed at this time is about **S=36 m/s.** B)
S = 36 m/s x (3600 s/1 hr) x (1 km/1000 meters) x (0.62 miles/km) = **80 mph**.

Problem 4 - What is the average acceleration of the shuttle during its first 20 seconds of flight?

Answer: Acceleration = velocity change/time, so between T=0 and T = 20 sec, the speed changed from 0 m/s to 148 m/s so A = 148/20 sec = **7.4 m/sec/sec**.