Free Fall Lab

Times	Average Time (t1+t2+t3)/3	Time at Peak (Average time)/2	Maximum Height Height = 0.5 a t^2 t = time at peak	Max Velocity v = a t t = time at peak
t1. 6.~~36~~ t2. 5.43 t3. 5.63	5.53	2.765	37.5m	27.1 m/s
t1 6.16 t2 6.05 t3 6.26	$6.15\overline{6}$	$3.0783\overline{3}$	46.432m	30.2 m/s
t1 5.98 t2 5.99 t3 5.73	5.9	2.95	42.64225 m	28.9 m/s

Questions:

1. Why do we use the average of three times? Accuracy
2. Why do we divide the average time by two to find the time at peak?
   That is the time when the balloon is at its highest point assuming no air resistance.
3. If a balloon is in the air for 10 seconds:
   a) What is the maximum height of the balloon? 125 m
   b) What was its fastest speed? 50 m/s
4. Sketch problem three labeling the maximum height and the velocity at each second.
5. How high would Michael Jordan have to jump if he had a hang time of two seconds? $t = \sqrt{2d/a}$ $d = \frac{at^2}{2}$ 19.6 m
6. On Earth it takes 2 seconds to fall 20 meters. On the moon acceleration due to gravity is about 1.63 m/s/s. On the moon, how long would it take to fall 20 meters? $t = \sqrt{2d/a}$
   4.95 s

$$\Delta y = V_0 t + \frac{1}{2} a t^2$$

$$0(5s) + \frac{1}{2}(10\ m/s^2)(5s)^2$$

$$\Delta y = 125\ m$$

$$V_f = V_0 + at$$

$$0\ m/s + 10\ m/s^2 \cdot 5s$$

$$= 50\ m/s$$