Extreme Difficulty

<u>Example Problem</u>
Holden is standing on top of a bridge in Central Park that is 25 m above the water below. He is frustrated with all the phonies in his life and decides to throw a rock straight up into the air and let it fall into the water below. If he throws with a velocity of 18 m/s straight up, how high does the rock go? How long will the rock spend in the air? How fast is it going when it hits the water?

The following are some of the hardest test questions that I could ask on your test.

1 - During a baseball game, a runner on first base attempts to steal second. The two bases are 20 meters apart, and the runner runs with an acceleration of 2 m/s/s. If the catcher is holding the ball 35 m away, what is the minimum speed he must he throw the ball (if it moves at a constant speed in the air) to have the ball arrive at second before the runner does.

2 - A ball is thrown downward with a speed of 35 m/s. How fast will the ball be traveling after it falls 50 meters?

3 - A cop is waiting at an intersection when Fast Eddie blows by at a constant 40 m/s. If the cop car accelerates at a constant 2.3 m/s/s, how long will it take the police officer to catch the speeder? (assume that the cop starts accelerating when Eddie is directly next to him.)

4 – Describe the motion needed to create this graph.
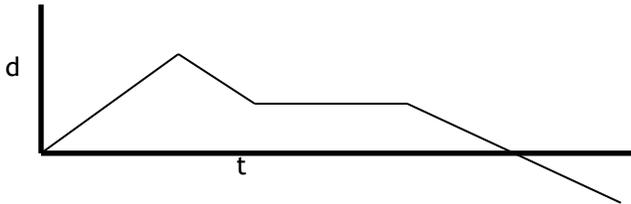
5 - Leeroy's car has a top speed of 20 m/s. If he hits the gas from rest, his car will accelerate at 1.2 m/s/s until he reaches top speed. Starting from rest, how long will it take him to complet a 800 m race?

6 - An echo is the result of sound bouncing on a surface and returning to the original source of noise. If Bertha is yodeling and hears her echo 4 seconds later, how far is she from the mountain. (sound = 320 m/s)

7 – Create a distance vs. time graph from the following story

A car moving at a constant speed is suddenly slowed down to a stop because of a flat tire. The driver then gets out and fixes the tire while the car is at rest. With a fixed wheel, the driver then accelerates up to the speed limit, and then resumes driving at a constant speed.