

Quantitative x,v,a graphs

Name: _____

Date: _____

Period: _____

Carefully plot the specified graphs for each situation below (this means using real numerical values rather than estimating).

1) A crab is strolling along the seafloor at 0.20 m/s, minding it's own business. Suddenly, the crab realizes its being followed. It remains at the same speed for 10 seconds, hoping to look nonchalant. Then the crab stops for 5 seconds, hoping to go unnoticed. Suddenly, the crab decides to make a run for it and speeds across the sand at 1.0 m/s for 3 seconds until it is able to hide under a large rock. Plot position and velocity graphs for this story, and determine the numerical value of the position and velocity during each time interval.

2) A dragster starts from rest and accelerates uniformly down a $\frac{1}{4}$ mile (400 m) dragstrip in 10 seconds, reaching a speed of 80m/s. The driver pops the parachute out the back and steps on the brakes as she crosses the finish line. The dragster decelerates uniformly to a stop in 20 seconds. Plot position, velocity, and acceleration graphs, and determine the numerical values for each time interval.

3) A NASA probe is dropped toward one of the many small moons of Saturn. It starts from rest and accelerates at a rate of 2.0 m/s^2 for 20 seconds. When it strikes the atmosphere its acceleration decreases to 0.5 m/s^2 and continues at this rate for 20 more seconds. The probe then strikes the surface of the moon, which turns out to be gooshy, like pudding. The probe decelerates uniformly to a stop in 5.0 seconds. Plot the position, velocity, and acceleration graphs and determine the numerical values of these quantities for each time interval.

4) A rubber ball is dropped and bounces up and down on the floor. SKETCH the position, and velocity graphs for the first 2 complete bounces. Label each graph with a description of the ball's behavior. Label the places on the graph where the velocity of the ball is zero. Label the places where the ball has its maximum velocity on each bounce.