Name: _____
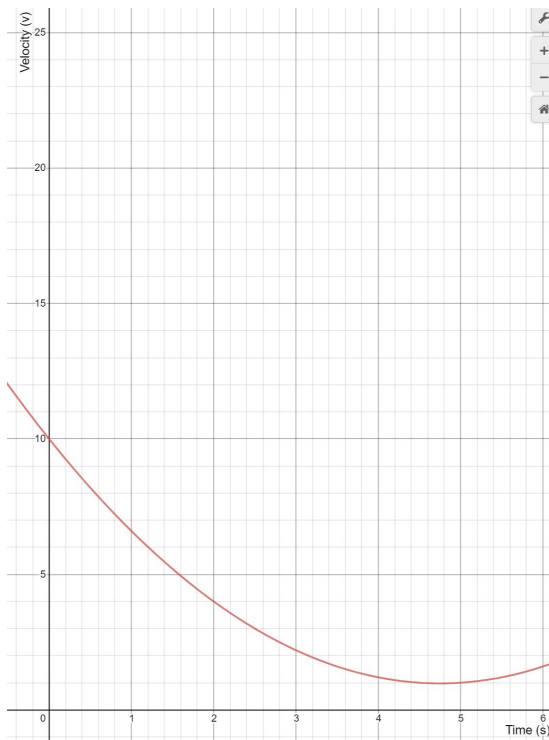
Date: _____

UASPACE's CubeSat Algebra II

1. UASPACE's CubeSat's velocity is reflected by the equation $v(t) = .4t^2 - 3.8t + 10$ from time $t = 0$, when the drag sail is deployed, to time $t = 4.75$. Time is measured in minutes and velocity is measured in meters per second.

a) If the drag sail is deployed at time t=0, what is the minimum velocity of the CubeSat? At what time does this occur?

b) What is the Cubesat's velocity at time $t = 3.25$?

2. You are 5 miles away from a rocket that is being launched. Once the rocket is 32,000 feet in the air, what angle are you viewing the rocket at? Note: 1 mile = 5280 feet

UASPACE's CubeSat Algebra II Solutions

1. a) .975 meters per second at time $t = 4.75$

    b) 1.875 meters per second

2. 50.4774 degrees

UASPACE's CubeSat Physics

1. A rocket is launched perpendicular to the earth's surface. At time $t = 8s$, the rocket's velocity is 95 meters per second and is continuing to accelerate.
   a) What is the rocket's acceleration assuming it remains constant?
   b) If this rate of acceleration continues, what will the position of the rocket be at time $t = 25s$?

   1. $v = v_0 + at$
   2. $\Delta x = (\dfrac{v + v_0}{2})t$
   3. $\Delta x = v_0 t + \dfrac{1}{2}at^2$
   4. $v^2 = v_0^2 + 2a\Delta x$

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2. A booster rocket detaches from the main rocket at time $t = 30s$ when the rocket is 5343.75 meters above the ground. It has a velocity of 356.25 meters per second and, once detached, is only affected by earth's gravity of $-9.8 \ m/s^2$.

    a) At what time and height will the booster reach maximum altitude and have a velocity of 0 m/s?

    b) At what time from the start will the booster return to the earth's surface at an elevation of 0 meters?

UASPACE's CubeSat Physics Solutions

1. a) $11.875 \ m/s^2$

   b) 3710.94 meters

2. a) 37.2704 seconds at 11814.8 meters

   b) 86.3079 seconds

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