

Please upload your solution to Problem 3 to canvas for marking after the workshop.

Problem 1

The position of a particle moving along an x -axis is given by $x = 12t^2 - 2t^3$, where x is in meters and t is in seconds. Determine:

- (a) the position,
- (b) the velocity, and
- (c) the acceleration of the particle at $t = 4$ s

Problem 2

A rock is thrown vertically upward from ground level at time $t = 0$. At $t = 1.5$ s it passes the top of a tall tower, and 1.0 s later it reaches its maximum height. What is the height of the tower?

Problem 3

Two particles move along an x axis. The position of particle 1 is given by $x_1 = 6.00t^2 + 3.00t + 2.00$; the acceleration of particle 2 is given by $a_2 = -8.00t$ and, at $t = 0$, its velocity is $v_2 = 20\text{ms}^{-1}$. When the velocities of the particles match, what is their velocity?

Problem 4

A ball is shot vertically upward from the surface of another planet. A plot of y versus t for the ball is shown in the figure below, where y is the height of the ball above its starting point and $t = 0$ at the instant the ball is shot. The figure's vertical scaling is set by $y_s = 30.0\text{m}$. What are the magnitudes of :

- (a) the free-fall acceleration on the planet and
- (b) the initial velocity of the ball?

