



$$s(t) = -5t^2 + 30t + 80$$

In general, an object moving through the air can be treated as a point mass instead of an extended object. A physics student knows that the mass of a large exoplanet is 250 times the mass of the Earth. He wants to simulate throwing an object directly upward in the air on the exoplanet with an initial velocity, v_0 , of 30 m/s from an initial height, s_0 , of 80 m with gravitational acceleration, a , of 10 m/s². The position, s , above the ground, can be expressed as a function of time, t . The object reaches its maximum height at a time $t_1 = v_0/a$. The velocity of the object in the vertical direction, at any time, t , can be represented as $v(t) = 30 - 10t$. What is the velocity of the object in m/s at a time $t_2 = 4.5$ seconds after the object reaches its maximum height?

- A) -47 m/s
- B) -46 m/s
- C) -45 m/s
- D) -44 m/s

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Student Notes