Answer on Question #51860, Physics, Mechanics, Kinematics, Dynamics

Question:

The displacement of a particle along the X-axis is given as

x=5t2+1

where x is in metres and t in seconds. Calculate its average velocity in the time interval between 2 s and 3 s.

21 m/s

40 m/s

46 m/s

25 m/s

Answer:

Velocity of the particle equals:

$$v = \frac{dx}{dt} = \frac{d}{dt}(5t^2 + 1) = 10t$$

Average velocity in the time interval between 2 s and 3 s equals:

$$v_a = \frac{\int_{t_1}^{t_2} v\, dt}{t_2 - t_1} = \frac{\int_2^3 10t\, dt}{3 - 2} = 5 \cdot 3^2 - 5 \cdot 2^2 = 25\frac{m}{s}$$

Answer: $25\frac{m}{s}$