Answer on Question#39895, Physics, Mechanics

Question:

A particle is moving along a straight line with velocity v=(t-4)m/s and find its average speed in time interval t=0 to t=8.

Answer:

Average speed equals:

$$v_a = \frac{d}{t}$$

where d is total distance travelled and t is time.

While $t < 4$ speed directed opposite x axis, distance equals:

$$d_1 = \left| \int_0^4 (t-4)\, dt \right| = \left| \frac{(4-4)^2}{2} - \frac{(0-4)^2}{2} \right| = 8\, m$$

When $t > 4$ speed directed along x axis, distance equals:

$$d_2 = \int_4^8 (t-4)\, dt = \frac{(8-4)^2}{2} - \frac{(4-4)^2}{2} = 8\, m$$

Total time equals $8\, s$.

Therefore, average speed equals:

$$v_a = \frac{d_1 + d_2}{t} = \frac{16}{8} \frac{m}{s} = 2 \frac{m}{s}$$

Answer: $2 \frac{m}{s}$