

Question 30424

Let south direction be the positive direction of x axis. For an accelerated motion, velocity changes by law $v(t) = v_{0x} \pm at$ (in our case, one needs to choose minus sign because acceleration slows down the particle (has opposite direction to direction of initial velocity)).

Integrating the last expression, obtain $x = x_0 + v_{0x}t - \frac{at^2}{2}$. The distance, traveled by particle is

$$S = |x - x_0| = v_{0x}t - \frac{at^2}{2}. \text{ In this expression, } v_{0x} = 2 \frac{m}{s}, a = 2 \frac{m}{s^2}, t = 5 s.$$

Calculating, obtain $S = 20 m$. Thus, particle has traveled 20 meters in 5 seconds.