

Physics 101Rec
Quiz#5a
Chapter 7

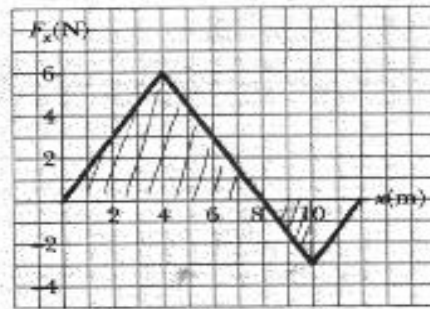
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Name: Key Id: _____ Sect: _____

A particle of mass $m = 2$ kg and starting from rest is subjected to a force F_x that varies with position as in the figure.

(a) What is the work done by the force when the particle moves from $x = 0$ m to $x = 10$ m?

$$\begin{aligned}
 W &= \text{area under the curve} \\
 &= \frac{1}{2} (4 \times 6) \times 2 - \frac{1}{2} (3 \times 2) \\
 &= 24 - 3 = 21 \text{ J}
 \end{aligned}$$



(b) What is the velocity of the particle at $x = 10$ m?

$$\Delta K = W \Rightarrow \frac{1}{2} m v_f^2 - 0 = 21$$

$$\Rightarrow v_f = \pm \sqrt{21} \text{ m/s}$$

$$\text{We choose } v_f = +\sqrt{21} = 4.6 \text{ m/s}$$

because the particle is moving toward the positive x direction.