

Question#19095

A particle travels to the right at a constant rate of 8.8 m/s. It suddenly is given a vertical acceleration of 2.6 m/s<sup>2</sup> for 3.8 s.

What is its direction of travel after the acceleration with respect to the horizontal?

Answer between  $-180^\circ$  and  $+180^\circ$ . Answer in units of  $^\circ$  008 (part 2 of 2) 10.0 points What is the speed at this time? Answer in units of m/s

Solution:

Let:

$$v_x = 8.8 \text{ m/s}$$

$$a = 2.6 \text{ m/s}^2$$

$$t = 3.8 \text{ s}$$

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$$v-?, \alpha-?$$

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The result of due acceleration is velocity on horizontal direction:

$$v_y = at$$

The angle of results velocity is:

$$\alpha = \arctg \frac{v_x}{v_y} = \arctg \frac{v_x}{at}$$

The value of velocity is:

$$v = \sqrt{v_x^2 + v_y^2} = \sqrt{v_x^2 + a^2 t^2}$$

$$\alpha = \arctg \frac{8.8}{2.6 \cdot 3.8} = 41.69^\circ = 41^\circ 41'$$

$$v = \sqrt{8.8^2 + 2.6^2 \cdot 3.8^2} = 13.23 \text{ m/s}$$

**Answer: direction on angel  $41^\circ 41'$  (to x-axis), velocity 13.23 m/s.**