Two-Dimensional Motion and Vectors, Practice D

1. $\Delta y = -0.70\ \text{m}$

$\Delta x = 0.25\ \text{m}$

$a_y = -g = -9.81\ \text{m/s}^2$

$$\Delta t = \sqrt{\frac{2\Delta y}{a_y}} = \frac{\Delta x}{v_x}$$

$$v_x = \sqrt{\frac{a_y}{2\Delta y}}\Delta x = \sqrt{\frac{-9.81\ \text{m/s}^2}{(2)(-0.70\ \text{m})}}(0.25\ \text{m}) = \boxed{0.66\ \text{m/s}}$$

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2. $\Delta y = -1.0\ \text{m}$

$\Delta x = 2.2\ \text{m}$

$a_y = -g = -9.81\ \text{m/s}^2$

$$\Delta t = \sqrt{\frac{2\Delta y}{a_y}} = \frac{\Delta x}{v_x}$$

$$v_x = \sqrt{\frac{a_y}{2\Delta y}}\Delta x = \sqrt{\frac{-9.81\ \text{m/s}^2}{(2)(-1.0\ \text{m})}}(2.2\ \text{m}) = \boxed{4.9\ \text{m/s}}$$

Givens *Solutions*

3. $\Delta y = -5.4\ \text{m}$

$\Delta x = 8.0\ \text{m}$

$a_y = -g = -9.81\ \text{m/s}^2$

$$\Delta t = \sqrt{\frac{2\Delta y}{a_y}} = \frac{\Delta x}{v_x}$$

$$v_x = \sqrt{\frac{a_y}{2\Delta y}}\Delta x = \sqrt{\frac{-9.81\ \text{m/s}^2}{(2)(-5.4\ \text{m})}}(8.0\ \text{m}) = \boxed{7.6\ \text{m/s}}$$

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4. $v_x = 7.6\ \text{m/s}$

$\Delta y = -2.7\ \text{m}$

$a_y = -g = -9.81\ \text{m/s}^2$

$$\Delta t = \sqrt{\frac{2\Delta y}{a_y}} = \frac{\Delta x}{v_x}$$

$$\Delta x = \sqrt{\frac{2\Delta y}{a_y}}v_x = \sqrt{\frac{(2)(-2.7\ \text{m})}{-9.81\ \text{m/s}^2}}(7.6\ \text{m/s}) = \boxed{5.6\ \text{m}}$$