

Ch. 4.

$$27. \quad v = \frac{290}{3.6} \text{ m/s} = \frac{725}{9} \text{ m/s}$$

$$v + \frac{g}{2} t = v \cdot \sin 30^\circ \quad \Rightarrow \quad t = \frac{d}{v + \frac{g}{2} t} = \frac{700}{\frac{725}{9} \times \frac{\sqrt{3}}{2}} \approx 10 \text{ s.}$$

$$h = (v \cdot \sin 30^\circ) \cdot t + \frac{1}{2} g t^2$$

$$= \frac{725}{18} \times 10 + \frac{1}{2} \times 10 \times 100 = \frac{725}{9} + 500 \approx 902.8 \text{ m}$$

Campus

$$28. \quad v_{1/2} = 42 \cdot \frac{\sqrt{3}}{2} = 21\sqrt{3} \text{ m/s}$$

$$(c) : |x| = \frac{v^2 - 0}{2g} = 66.15 \text{ m}$$

$$t = \frac{21\sqrt{3}}{10} \times 2 = \frac{21\sqrt{3}}{5} \text{ s} \quad t' = \left(\frac{21\sqrt{3}}{5} - 5.5 \right) \text{ s}$$

$$\therefore h = \frac{1}{2} g t^2 = \frac{1}{2} \times 10 \times \left(\frac{21\sqrt{3}}{5} - 5.5 \right)^2 \approx 15.7 \text{ m}$$

$$v_{u\frac{3}{4}} = 21 \text{ m/s} \quad v_{u\frac{3}{4}} = (21\sqrt{3} - 55) \text{ m/s}$$

$$\therefore v_{\frac{3}{4}} \approx 27.49 \text{ m/s}$$

$$(a) \quad h = 15.7 \text{ m} \quad (b) \quad v = 27.49 \text{ m/s} \quad (c) \quad h = 66.15 \text{ m}$$

68.

$$a = \frac{v^2}{r}$$

$$r = \frac{2\pi r}{2} = (t_2 - t_1) \cdot \vec{v} \quad \therefore r = \frac{2.5}{\pi} = \frac{15}{\pi}$$

$$\therefore a = \frac{25}{\frac{15}{\pi}} = \frac{5\pi}{3} \text{ m/s}^2$$

$$\vec{a} = \left(\frac{5\pi}{3} \text{ m/s}^2 \right) \hat{i} + \left(-\frac{8}{3} \text{ m/s}^2 \right) \hat{j}$$

$$74. \quad v = \frac{55 \text{ km}}{\left(\frac{1.8}{60} \text{ h} \right) \hat{j}} = 180 \text{ km/h} \hat{j}$$

$$v' = 42 \text{ km/h} (\cos 20^\circ \hat{i} - \sin 20^\circ \hat{j}) = 42 \cos 20^\circ \hat{i} - 42 \sin 20^\circ \hat{j}$$

$$v'' = 42 \cos 20^\circ \hat{i} + (180 + 42 \sin 20^\circ) \hat{j}$$

$$\therefore |\vec{v}''| \approx 200 \text{ km/h}$$