

$$\vec{V}(0) = 207 \frac{\text{ft}}{\text{s}} \angle 42^\circ$$

$$\vec{a}(0) = \begin{pmatrix} 0 \\ -32 \end{pmatrix} \frac{\text{ft}}{\text{s}^2} \quad \vec{V}(0) = \begin{pmatrix} 207 \cos 42^\circ \\ 207 \sin 42^\circ \end{pmatrix} \frac{\text{ft}}{\text{s}}$$

$$\vec{r}(0) = \begin{pmatrix} 0 \\ 3 \end{pmatrix} \text{ft}$$

$$\vec{a}(t) = \begin{pmatrix} 0 \\ -32 \end{pmatrix} \text{ ft/s}^2$$

$$\vec{v}(t) = \begin{pmatrix} 207 \cos 42^\circ \\ -32t + 207 \sin 42^\circ \end{pmatrix}$$

$$\vec{r}(t) = \begin{pmatrix} 207 \cos 42^\circ t \\ -16t^2 + 207 \sin 42^\circ t + 3 \end{pmatrix}$$

$$\frac{dv}{dt} = -32$$

$$\int dv = -32 \int dt$$

$$v = -32t + C$$

$$207 \sin 42^\circ = -32(0) + C$$

$$\frac{dx}{dt} = 207 \cos 42^\circ$$

$$\int dx = 207 \cos 42^\circ \int dt$$

$$\frac{dy}{dt} = -32t + 207 \sin 42^\circ$$

$$\int dy = \int (-32t + 207 \sin 42^\circ) dt$$

$$y = -16t^2 + 207 \sin 42^\circ t + C$$

$$3 = -16(0)^2 + 207 \sin 42^\circ (0) + C$$

$$3 = C$$

$$x = 207 \cos 42^\circ t + C$$

$$0 = 207 \cos 42^\circ (0) + C$$

$$0 = C$$

$$-32t_z + 207 \sin 42^\circ = 0$$

$$-32t_z = -207 \sin 42^\circ$$

$$t_z = \frac{207 \sin 42^\circ}{32} = 4.328 \text{ sec}$$

$$r_y(t_z) = 302.766 \text{ ft}$$

$$r_x(t_z) = 665.848 \text{ ft}$$

$$-16t_R^2 + 207 \sin 42^\circ t_R + 3 = 0$$

$$t_R \doteq 8.678 \text{ sec}$$

$$r_x(t_R) \doteq 1335.019 \text{ Ft}$$

