(1)

$$x''(t) = -\frac{v}{4}$$

$$\frac{dv}{dt} = -\frac{v}{4}$$

$$dv = -\frac{v}{4}\,dt$$

$$\int \frac{dv}{v} = \int -\frac{1}{4}\,dt$$

$$\ln|v| = -\frac{t}{4} + C$$

$$e \qquad e$$

$$V(t) = 207\cos(42^\circ)e^{-t/4} \qquad V = De^{-t/4}$$

$$207\cos(42^\circ) = De^0$$

$$207\cos(42^\circ) = D$$

(2) $V(t) = 207\cos(42°)e^{-t/4}$

$$\frac{dx}{dt} = 207\cos(42°)e^{-t/4}$$

$$\int dx = \int 207\cos(42°)e^{-t/4}\,dt$$

$$X(t) = C2 - 828\cos(42°)e^{-t/4}$$

$$0 = C2 - 828\cos(42°)e^{0}$$

$$0 = C2 - 828\cos(42°)$$

$$C2 = 828\cos(42°)$$

$$X(t) = 828\cos(42°)\left(1 - e^{-t/4}\right)$$

(3) $\frac{dv}{dt} = -32 - \frac{v}{4}$

$\frac{dv}{dt} = -\frac{1}{4}(128 + v)$

$\int \frac{dv}{128+v} = -\frac{1}{4}\int dt$

$\ln|128+v| = \frac{-t}{4} + c$

$e \qquad\qquad e$

$128 + v = De^{-t/4}$

$v = De^{-t/4} - 128$

$207\sin(42^\circ) = De^{0} - 128$

$D = 128 + 207\sin(42^\circ)$

$v = (128 + 207\sin(42^\circ))e^{-t/4} + 128$

(4) $\frac{dy}{dt} = (128 + 207\sin(42^\circ))e^{-t/4} - 128$

$y = -4(207\sin(42^\circ) + 128)e^{-t/4} - 128t + C$