Problem 1.

E.

Problem 2.

E.

Problem 3.

a) $a = 0.0337 \frac{\mathrm{m}}{\mathrm{s}^2}$
b) $T = 1.41\ \mathrm{h}$

Problem 4.

$v_0 = 14.4 \frac{\mathrm{m}}{\mathrm{s}}$

Problem 5.

a) $\theta = 6.84°$
$v_0 = 20.4 \frac{\mathrm{m}}{\mathrm{s}}$
$T = 0.495\ \mathrm{s}$

Problem 6.

$v_{0x} = 1.6 \frac{\mathrm{m}}{\mathrm{s}}$
$v_{0y} = 7 \frac{\mathrm{m}}{\mathrm{s}}$
$T = 1.8\ \mathrm{s}$
$\theta = 77°$

Problem 7.

D.

Problem 8.

$v_0 = \sqrt{gL}$
$\theta = 45°$

Problem 9.

a) $T = \frac{2L}{v_0}$

b) $h = \frac{2gL^2}{v_0^2}$

c) $|\overrightarrow{v_{\text{rel}}}| = \sqrt{\frac{v_0^2}{4} + 2gh}$

Problem 10.

a) See solution document for sketch.

b) $v_1 = 27.8 \frac{\text{m}}{\text{s}}$

c) $27.8 \frac{\text{m}}{\text{s}} < v_0 < 29.1 \frac{\text{m}}{\text{s}}$

Problem 11.

a) $v(t) = a_0 t$

$a_{\text{rad}} = \frac{a_0^2 t^2}{R}$

b) $a = a_0 \sqrt{1 + 16\pi^2}$