$x_f = 80\text{ ft} - 15\text{ ft/s}\,\delta t$

Short answer question answer key

Unit 1: a) 13,000N $(F = ma = (1300\text{kg})(9.8\text{m/s}^2) = 12700\text{N})$

b) 2.3 sec $\rightarrow a = \frac{\Delta v}{\Delta t} = 22.3\text{ m/s}$

c) $\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$

$= (22.3\text{ m/s})(2.3\text{sec}) + \frac{1}{2}(-9.8\text{m/s}^2)(2.3\text{sec})^2$

Unit 2: a) $v_x = 25.7\text{m/s}$

$v_y = 30.6\text{m/s}$

b) $v_{fy} = v_{iy} + a\Delta t$

$0 = 30.6 + (-9.8\text{m/s}^2)\Delta t$

$\Delta t = 3.1\text{sec}$

c) $v_{fy}^2 - v_{iy}^2 = 2a\Delta y$

or $\Delta y = v_{iy}\Delta t + \frac{1}{2} a \Delta t^2$

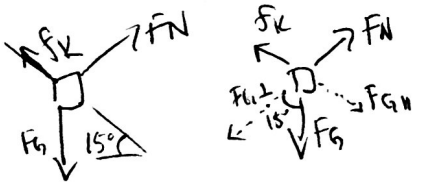
47.7m

d) $3.1\text{sec} \times 2 = 6.2\text{sec}$

e) $a = \frac{\Delta v}{\Delta t} = \frac{40\text{m/s}}{0.05\text{sec}} = 80\text{m/s}^2$

$F = ma \quad = (0.2\text{kg})(80\text{m/s}^2) = 16\text{N}$

Unit 3: a)



$F_N = F_{G\perp} = mg\cos\theta = (75\text{kg})(9.8\text{m/s}^2)(\cos 15)$

$F_N = 709\text{N}$

b) $\Sigma F_{\parallel} = F_{G\parallel} - f_K$

$F_{G\parallel} = mg\cos\theta$

$= (75\text{kg})(9.8)\sin 15$

$= 190\text{ N}$

$f_K = \mu_K F_N$

$= (0.05)(709\text{N})$

$f_K = 35.5\text{N}$

$\Sigma F_{\parallel} = 190\text{N} - 35.5\text{N} = \boxed{154.5\text{N}}$

c) $\Sigma F_{\parallel} = ma_{\parallel}$

$154.5\text{N} = (75\text{kg})a_{\parallel}$

$a_{\parallel} = \boxed{2.06\text{m/s}^2}$

d) $a = \frac{\Delta v}{\Delta t} \rightarrow \Delta v = a\Delta t$

$= 2.06\text{m/s}^2(5\text{ sec})$

$= \boxed{10.3\text{m/s}}$

e) $\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$ ($v_i = 0$)

$= \frac{1}{2}(2.06)(5)^2$

$= \boxed{25.8\text{m}}$

or $v_f^2 - v_i^2 = 2a\Delta x$

$(10.3)^2 - 0^2 = 2(2.06)\Delta x$