$\theta = 45.00°$

$m = 45.00\ kg$

$g = 9.81\ \frac{m}{s^2}$

$d = 3{,}906.05\ m$

$+ < 1.000\ m$

60 s

$$d_x = v_{i_x} t + \frac{1}{2} a t^2$$

(the $\frac{1}{2} a t^2$ term $\rightarrow 0$)

$$3{,}906.05 = v_{i_x}\ 60$$

$$v_{i_x} = 65.10\ \frac{m}{s}$$

$$\cancel{v_{fy}}^{0} = v_{iy} + a_y t$$

$$\frac{-v_{iy}}{g} = t = 30$$

$$\frac{-65.1}{-9.81} = 6.63\,s$$

a)

X

$d_x = v_{ix}t + \frac{1}{2}at^2$ ($\frac{1}{2}at^2 \to 0$)

$d_x = v_{ix}t$

$\frac{d_x}{v_{ix}} = t$

Y

$v_{fy} = v_{iy} + at$ ($v_{fy} \to 0$)

$0 = v_{iy} + at$

$v_{ix} = v_{iy} = v_{ic}$

$\frac{-v_{ic}}{-g} = t$

$\frac{d_x}{v_{ic}} = \frac{2v_{ic}}{-g}$

$$\frac{3906.05}{V_{1c}} = \frac{-2V_{1c}}{-9.81}$$

$$38318.3505 = +2V_{1c}^2$$

$$V_{1x} = V_{1y} = V_{1c} = 138.4 \frac{m}{s}$$

$$V_1 = 195.7 \frac{m}{s}$$

b) $v_f^2 = v_i^2 + 2ad$ ($v_f = 0$)

$$\frac{-v_{1y}^2}{2g} = d \qquad d = 926.5\ m$$

c) $F = ma$ $\quad v_f^2 = \cancel{v_i^{2\,\to 0}} + 2ad$

$$\frac{v_f^2}{2d} = a$$

$F = ma$

$F = 212{,}800\ N$

$$\frac{(195.7)^2}{2(4.050)} = a$$

$a = 4728\ \frac{m}{s^2}$