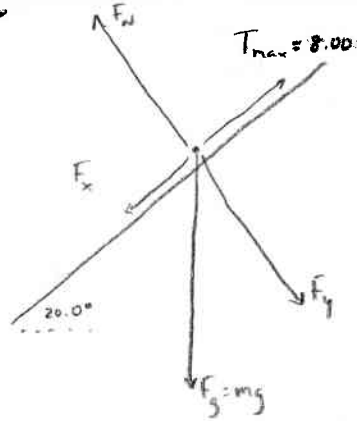
2.



a) $F_x = mg \sin\theta$

$= (2.00 \times 10^3)(-9.80)(\sin 20.0°)$

$= -6700$ N

(6700 is less than 8000; will hold)

b) $\Sigma F_x =$

$F_x = ma_x$ $\quad a_x = \frac{F_x}{m} = \frac{-6700}{2.00 \times 10^3} = -3.35 \text{ m/s}^2$

$V_i = 0$ m/s

$V_f = 35.0$ m/s

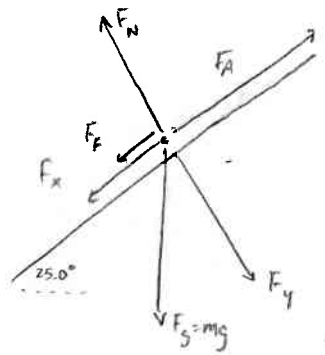
$a = -3.35$ m/s^2

$\Delta d = \frac{V_f^2 - V_i^2}{2a}$

$= \frac{35.0^2 - 0^2}{2(-3.35)}$

$= 184$ m

4.



$\Sigma F_x = F_A + F_F + F_x = ma_x$

$F_A = ma_x - F_F - F_x$

$= (65.0)(7.00) - (-115) - (-65.0)(9.80)(\sin 25.0°)$

$= 455 + 115 + 269$

$= 839$ N

$\Sigma F_y = F_N + F_y = ma_y$ $\quad a_y = 0 \text{ m/s}^2$

$F_N = -F_y$

$= -mg \cos\theta$

$= -(65.0)(-9.80)\cos 25.0°$

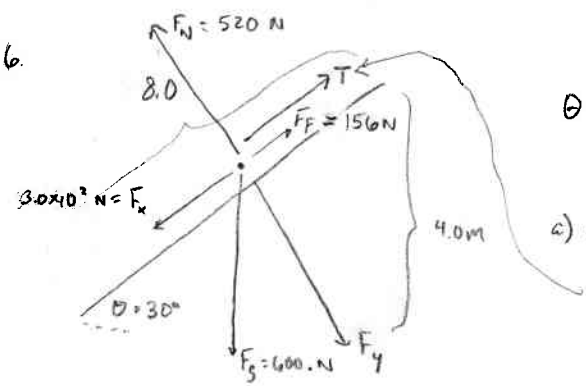
$= 577$ N

$F_F = \mu_k F_N$

$= (.200)(577)$

$= 115$ N

6.



$\theta = \sin^{-1}\frac{4.0}{8.0}$

$= 30°$

a) $\mu_k = .30$

c) since $F_x = 3.0 \times 10^2$ N and $F_F = 180$ the safe will need to be lowered down by pulling back on a rope.

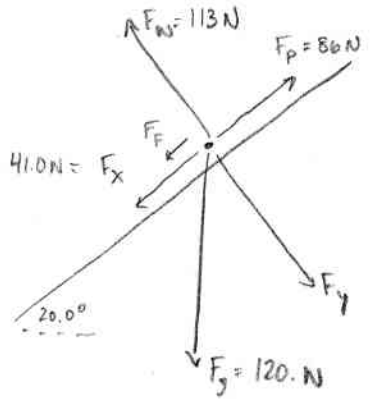
b) $\Sigma F_x = F_x + F_F + T = ma_x$ $\quad a_x = 0 \text{ m/s}^2$

$T = -F_x - F_F$

$= -(-3.0 \times 10^2) - 156$

$= 140$ N

8.



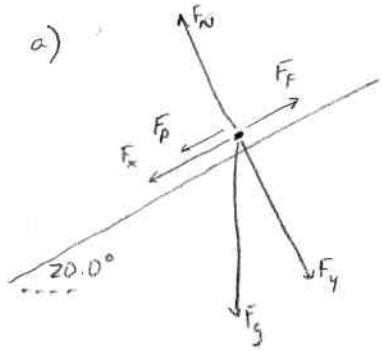
$\Sigma F_x = F_p + F_x + F_F = ma_x \quad a_x = 0\ m/s^2$

$F_F = -F_p - F_x$

$= -86 - (-41.0)$

$= -45\ N$

a)



$\Sigma F_x = F_x + F_p + F_F = ma_x \quad a_x = 0\ m/s^2$

$F_p = -F_x - F_F$

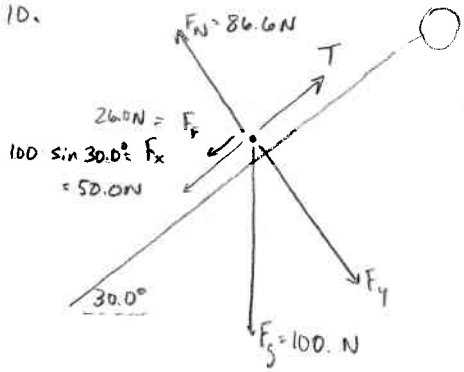
$= -(-41.0) - 45$

$= -4\ N$

b) $\mu_k = \frac{F_F}{F_N} = \frac{45}{113}$

$= .40$

10.



$\mu_k = .30$

$F_F = \mu_k F_N$

$= (.30)(86.6)$

$= 26.0\ N$

a) $\Sigma F_x = T + F_F + F_x = ma_x \quad a_x = 0\ m/s^2$

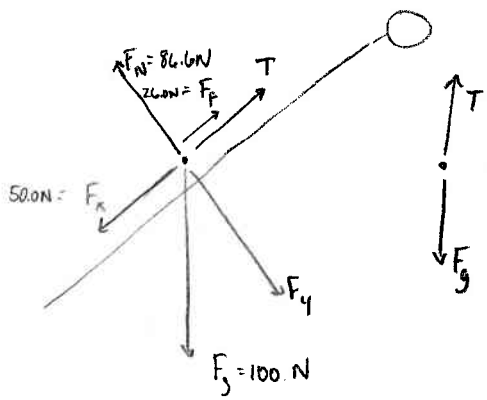
$T = -F_F - F_x$

$= -(26.0) - (-50.0)$

$= 76.0\ N$

by third law $F_g = -76.0\ N$

b)



$\Sigma F_x = T + F_F + F_x = ma_x \quad a_x = 0\ m/s^2$

$T = -F_F - F_x$

$= -26.0 - (-50.0)$

$= 24\ N$