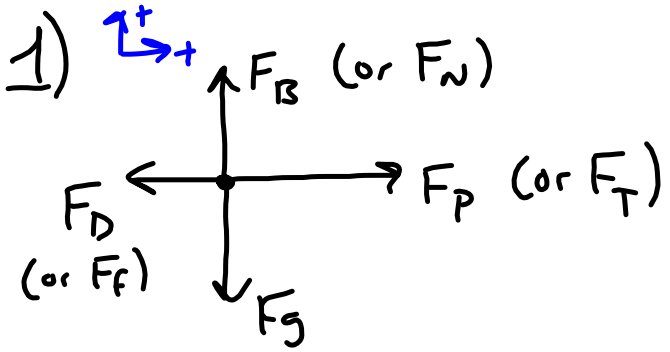
Review - Forces

1)



$m = 80\ kg$

$a_x = 1.8\ m/s^2$

$F_P = 220\ N$

$F_D = ?$

$$\Sigma \bar{F} = m\bar{a}_x$$

$$\bar{F}_P - F_D = ma_x$$

$$F_D = F_P - ma_x$$

$$= 220\ N - (80\ kg)(1.8\ m/s^2)$$

$$= 76\ N \text{ (left)}$$

2) $\sum \bar{F}_x = m\bar{a}_x$

$\rightarrow^+$ $= (2000\ kg)(-3.75\ m/s^2)$

$= -7500\ N$

$v_{fx} = v_{ix} + a_x t$

$a_x = \frac{v_{fx} - v_{ix}}{t} = \frac{5\ m/s - 20\ m/s}{4\ s} = -3.75\ m/s^2$

3) $\Sigma \bar{F} = m\bar{a}$

$= (0.15\,kg)(665\,m/s^2)$

$= 99.75\,N$

$v_i = 0\,m/s$

$v_f = 44.7\,m/s$

$\Delta x = 1.5\,m$

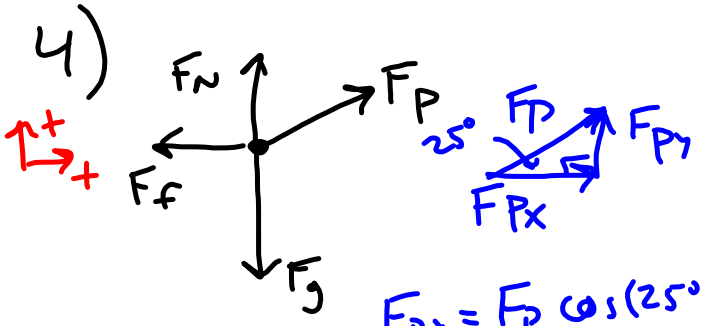
$a = ?$

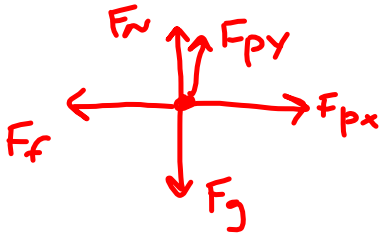
$v_f^2 = v_i^2 + 2a\Delta x$

$a = \dfrac{v_f^2 - v_i^2}{2\Delta x}$

$= 665\,m/s^2$

4)





$m = 100\ kg$

$F_f = 15\ N$

$F_{Px} = F_P \cos(25°)$

$= 109\ N$

$F_{Py} = F_P \sin(25°)$

$= 50.7\ N$

$$\sum \bar{F}_x = m\bar{a}_x$$

$$F_{Px} - F_f = ma_x$$

$$a_x = \frac{F_{Px} - F_f}{m}$$

$$= \frac{109\ N - 15\ N}{100\ kg}$$

$$= 0.94\ m/s^2$$