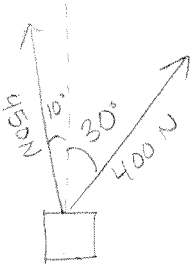
P #12

Ch 4 - pg 107

a)

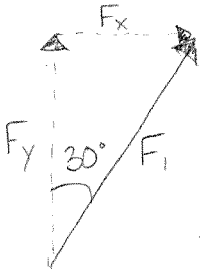
$F_1 = 400\,N$
$F_2 = 450\,N$

$F_{net} = ?$



For F_2:

For F_1:



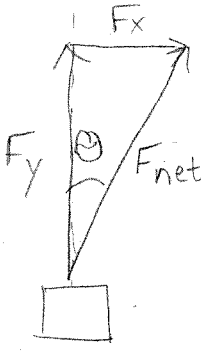
$F_{y1} = F \cdot \cos\theta$
$= (400N) \cdot \cos 30$
$F_{y1} = 346\,N$

$F_{x1} = F \cdot \sin\theta$
$= (400N) \cdot \sin 30$
$F_{x1} = 200\,N$

$F_{y2} = F \cdot \cos\theta$
$= (450N) \cdot \cos 10$
$F_{y2} = 443\,N$

$F_{x2} = F \cdot \sin\theta$
$= (450N) \cdot \sin 10$
$F_{x2} = -78\,N$

For F_{net}:



$F_x = F_{x1} + F_{x2}$
$= 200N + -78N$
$F_x = 122N$

$F_y = F_{y1} + F_{y2}$
$= 346\,N + 443\,N$
$F_y = 789\,N$

$F_{net}^2 = F_x^2 + F_y^2$
$= (122\,N)^2 + (789\,N)^2$

$F_{net} = 798\,N$

$\tan\theta = \frac{F_x}{F_y}$ so $\theta = \tan^{-1}\left(\frac{F_x}{F_y}\right)$

$\theta = \tan^{-1}\left(\frac{122\,N}{789\,N}\right)$

$\theta = 8.8°$ to the right of forward

b) $F_{Net} = 798\,N$
$m = 3000\,kg$
$a = ?$

$F_{net} = m \cdot a$

$(798\,N) = (3000\,kg) \cdot a$

$a = .266\,m/s^2$