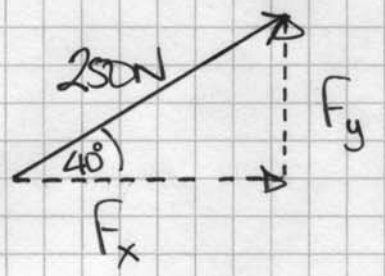
Homework 3 – Forces.

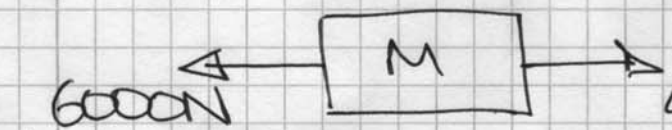
1.



$$F_x = 250 \times \cos 40^\circ$$
$$= 250 \times 0.766$$
$$= \underline{191.5N}$$

$$F_y = 250 \times \sin 40^\circ$$
$$= 250 \times 0.643$$
$$= \underline{160.75N}$$

2. (a) Start with a free body diagram.



unbalanced force = 6000 − 4900

= 1100N

$F = Ma \rightarrow a = \frac{F}{M}$

$a = \frac{1100N}{2000kg}$

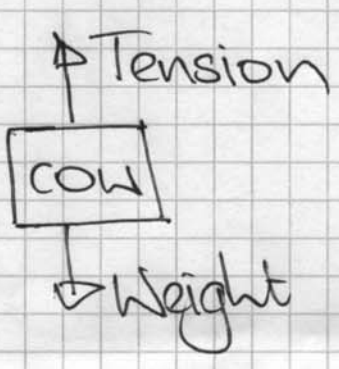
$M = M_{cow} + M_{tractor}$

$M = 500 + 1500$

$= 2000kg$

$$\underline{a = 0.55 ms^{-2}}$$

(b)



2. (c).

Unbalanced force $F = Ma$

$= 500 \times 0.55$

$= 275N.$

from freebody diagram in part (b)

U.F. = Tension − Weight

$275 = T - (Mg)$

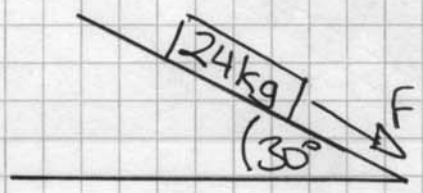
$275 = T - (500 \times 9.8)$

$275 = T - 4900$

$T = 275 + 4900$

$\rightarrow \underline{T = 5175N}$

3.



$F = Mg \sin\theta$

$= 24 \times 9.8 \times \sin 30°$

$= 24 \times 9.8 \times 0.5$

$\underline{F = 117.6N}$