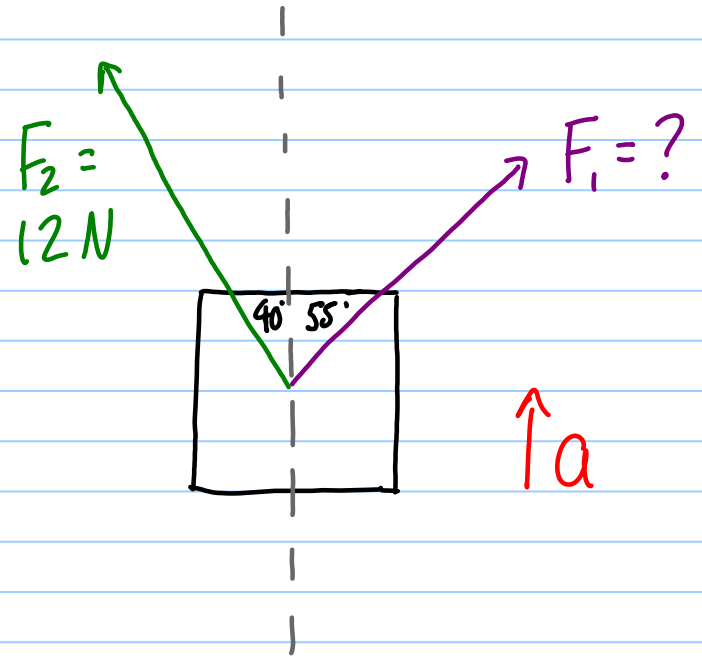
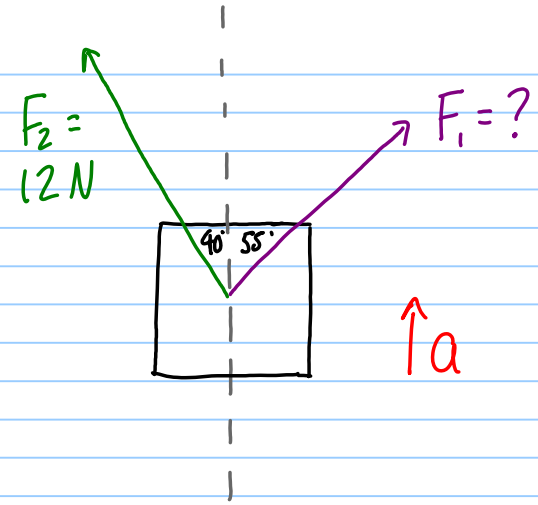
# Quiz 2c

Note Title 18/10/2011

Two forces act on a 4.0 kg block as shown below. As a result the block accelerates due north.

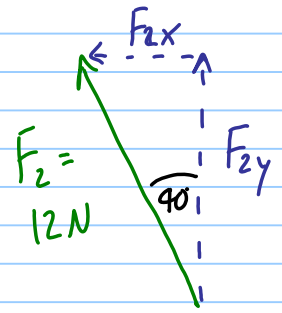
a) Find the magnitude of the unknown force.
b) Find the magnitude of the accleration.






a.) Since the acceleration is due North then $\sum F_x = 0$
(i.e. there is no side to side acceleration ∴ no net force)

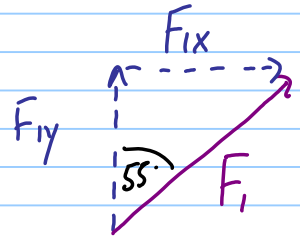
$$\sum F_x = F_{1x} + F_{2x} = 0 \quad \therefore \quad F_{1x} = -F_{2x}$$ ✓




$F_{2x} = F_2 \sin 40 = -7.713\ N$

$\therefore F_{1x} = -(-7.713\ N)$

$= 7.713\ N$ ✓




$\sin 55 = \frac{F_{1x}}{F_1}$

$F_1 = \frac{F_{1x}}{\sin 55} = \frac{7.713}{\sin 55} = \boxed{9.42\ N}$ ✓

b.) $\sum F_y = F_{1y} + F_{2y}$

$= F_1 \cos 55 + F_2 \cos 40°$

$= 9.42 \cos 55 + 12 \cos 40°$

$= 14.60\ N$ ✓

$F_{net} = F_y = ma \qquad a = \frac{F_y}{m} = \frac{14.60\ N}{4.0\ kg}$

$= \boxed{3.6\ m/s^2}$ ✓