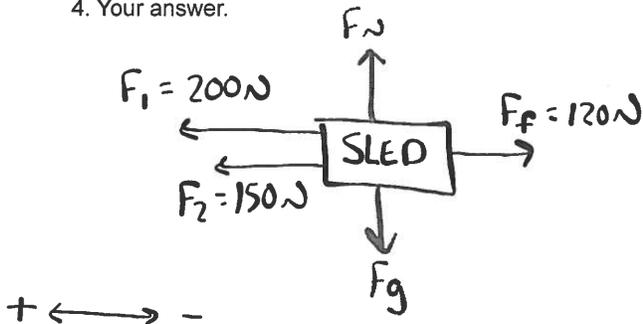
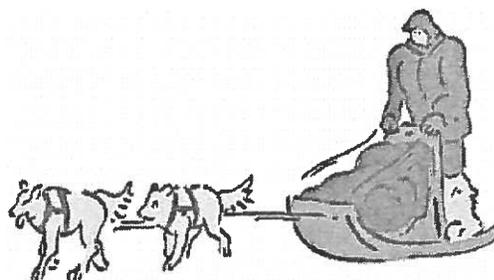


L02 - Calculating Net Forces

Easy Questions

Q1: The lead dog is pulling the dogsled with 200N of force. The second dog is pulling with 150N of force. If the force of friction acting on the sled is 120N, what is the net force acting on the sled?

1. Draw a Free-Body Diagram
2. What do you know?
3. Equation for Net Force, with units.
4. Your answer.

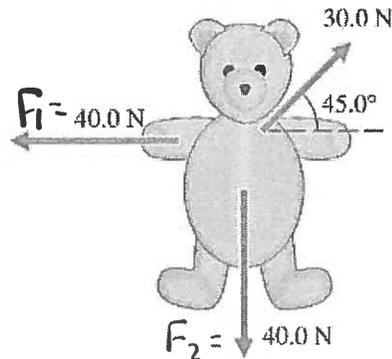


$$\begin{aligned}\vec{F}_{\text{net}} &= \vec{F}_1 + \vec{F}_2 + \vec{F}_f \\ &= 200\text{N}[L] + 150\text{N}[L] - 120\text{N}[L] \\ &= 230\text{N}[L]\end{aligned}$$

Medium Questions

Q2: Three children are fighting over a teddy bear. The first applies a force of 40N [West], the second applies a force of 40N [South], and the third child applies a force of 30N [45° N of E]. What is the Net Force (magnitude and direction)? In what direction will the teddy bear be pulled?

1. Draw a Free-Body Diagram
2. What do you know?
3. Each force broken into x-comp and y-comp.
4. Equation for Net Force, with units.
5. Answers.



	x	y
F_1 ← 40	-40	0
F_2 ↓ 40	0	-40
F_3 30 45° a	$\cos \theta = \frac{a}{h}$ $\cos 45 = \frac{F_{3x}}{30}$ $= 21.2$	$\sin \theta = \frac{b}{h}$ $= 21.2$
F_{net}	-18.79	-18.79

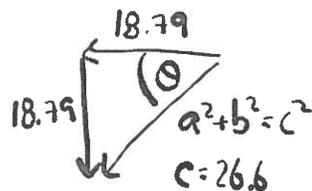
$$a^2 + b^2 = c^2$$

$$18.79^2 + 18.79^2 = c^2$$

$$353 + 353 = c^2$$

$$705.987 = c^2$$

$$26.6 = c$$



$$\tan \theta = \frac{a}{b}$$

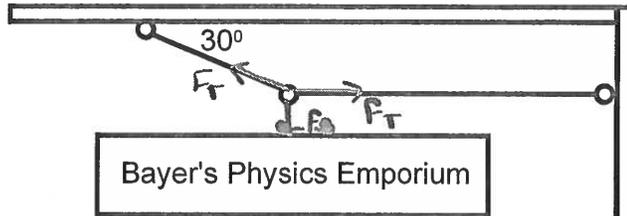
$$\theta = 45^\circ$$

$$\vec{F}_{net} = 26.6 \text{ N } [45^\circ \text{ S of W}]$$

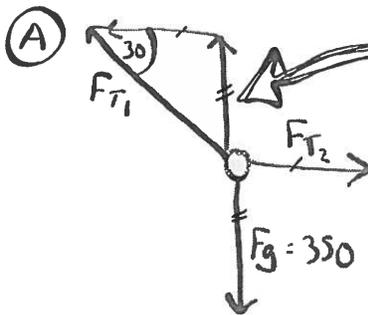
Hanging Sign Questions

Q3: A hanging sign experiences a gravitational force of 350N. What is the tension experienced by each rope?

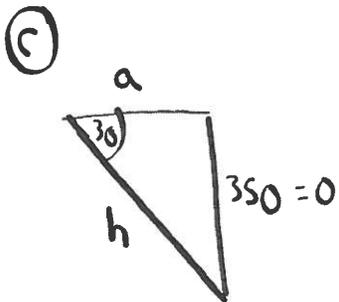
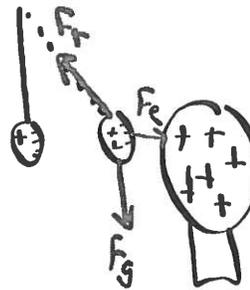
1. Draw a Free-Body Diagram
2. What do you know?
3. Each force broken into x-comp and y-comp.
4. Equation for Net Force, with units.
5. Answers.



Look at circle joint thingy...



(B) Assume that $F_{T1y} = 350$



SohCahToa

Solve for h Solve for a

$$\sin 30 = \frac{350}{h}$$

$$\times h \quad \times h$$

$$h(\sin 30) = 350$$

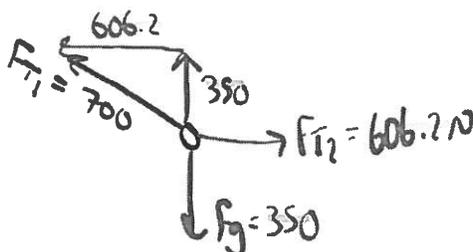
$$\div \sin 30 \quad \div \sin 30$$

$$\tan 30 = \frac{o}{a}$$

$$a = \frac{o}{\tan 30} = \frac{350}{\tan 30}$$

$$h = \frac{350}{\sin 30} \Rightarrow h = 700$$

$$a = 606.2$$



$$F_{T1} = 700 \text{ N}$$

$$F_{T2} = 606.2 \text{ N}$$

Practice Questions

Easy Questions:

- Pg 136 #2, 3

Medium Questions:

- Pg 136 #5, 6

Hanging Sign Questions:

- Pg 136 #7

- Pg 135 #1,2