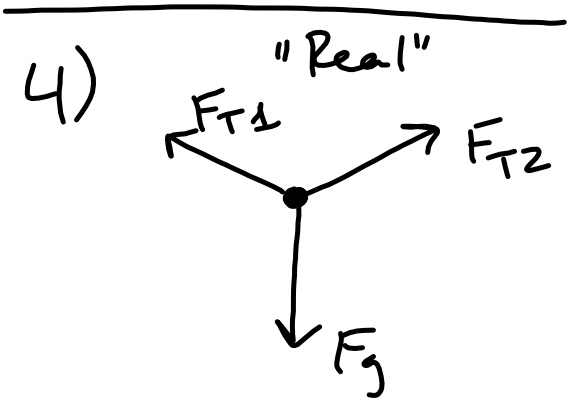
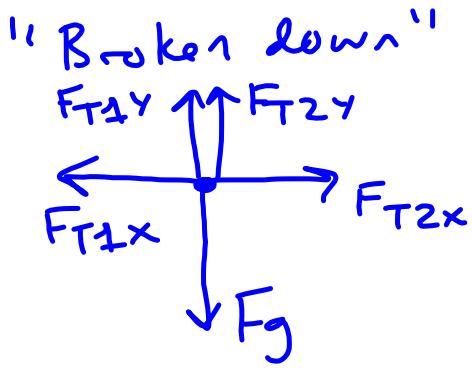
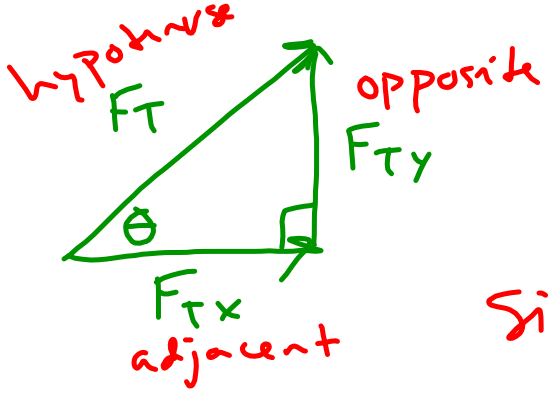
Worksheet 16

4)





Right Triangles



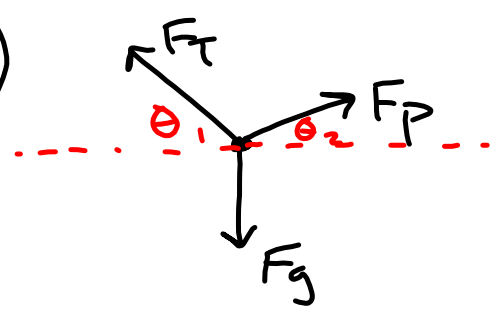
θ = angle with horizontal (Greek lowercase theta)

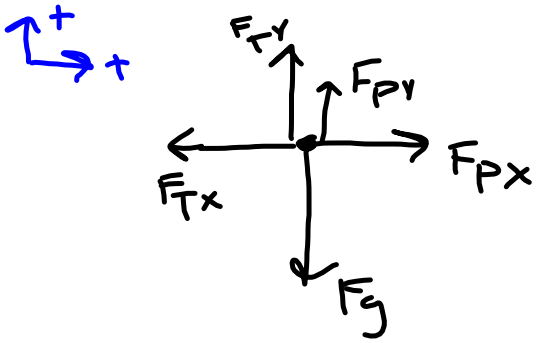
$$\sin\theta \equiv \frac{\text{opposite}}{\text{hypotenuse}} = \frac{F_{Ty}}{F_T}$$

$$\cos\theta \equiv \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{F_{Tx}}{F_T}$$

$$\tan\theta \equiv \frac{\text{opposite}}{\text{adjacent}} = \frac{F_{Ty}}{F_{Tx}}$$

7)





$\sum \bar{F}_x = \emptyset$ $\sum \bar{F}_y = \emptyset$

net force in x-direction net force in y-direction

$F_{Px} - F_{Tx} = \emptyset$ $F_{Ty} + F_{Py} - F_g = \emptyset$

Weight and Mass

Weight → F_g → changes depending on where you are

mass → m → doesn't change unless adding or removing atoms

$$F_g = mg$$

F_g → weight

m → mass

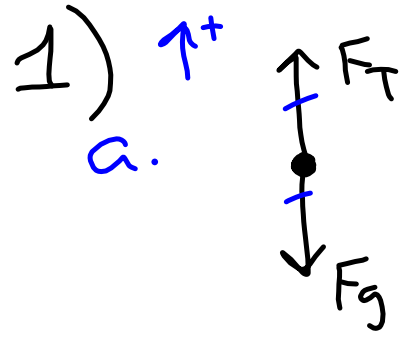
g → acceleration due to gravity

Units of force ≡ Newtons (N)

$kg \cdot m/s^2$

Worksheet 3

1) a.



$$\Sigma F_y = \emptyset$$

$$F_T - F_g = \emptyset$$

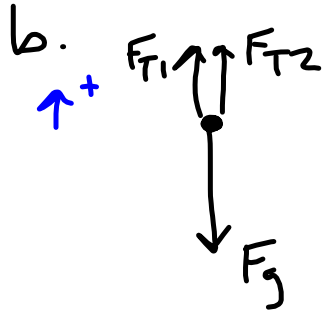
$$F_T = F_g$$

$$= m a_g$$

$$= (5\,kg)(9.8\,m/s^2)$$

$$= 49\,N$$

b.



$$F_{T1} = F_{T2} = F_T$$

$$\Sigma F_y = \emptyset$$

$$F_{T1} + F_{T2} - F_g = \emptyset$$

$$F_T + F_T - F_g = \emptyset$$

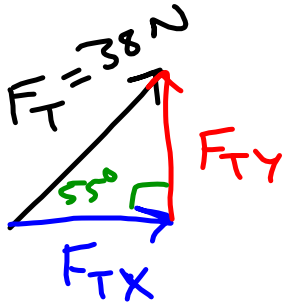
$$2F_T = F_g$$

$$F_T = \frac{m a_g}{2}$$

$$= \frac{(5\,kg)(9.8\,m/s^2)}{2}$$

$$= 24.5\,N$$

3)



$$\sin(55°) = \frac{F_{TY}}{F_T}$$

$$F_{TY} = F_T \sin(55°)$$

$$= (38\ N)\sin(55°)$$

$$= 31.13\ N$$

$$\cos(55°) = \frac{F_{TX}}{F_T}$$

$$F_{TX} = F_T \cos(55°)$$

$$= (38\ N)\cos(55°)$$

$$= 21.8\ N$$