Quiz 4a
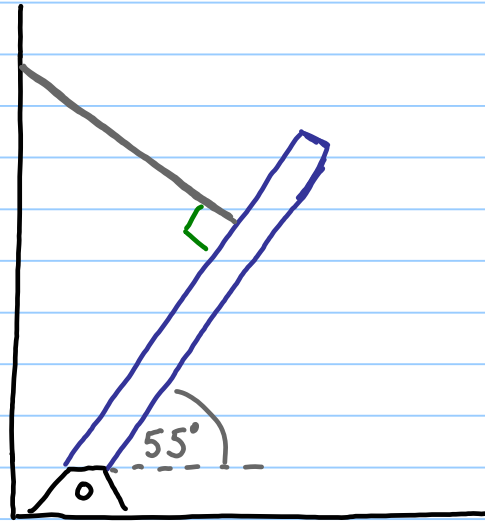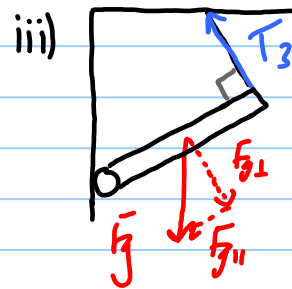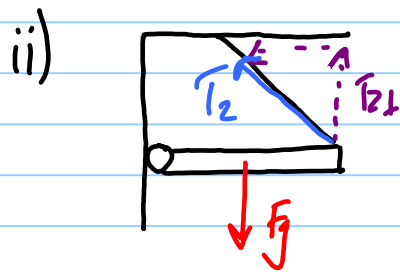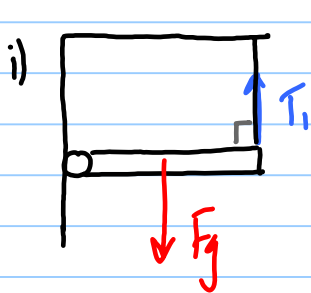
1.) Rank the following from least to greatest tension in the cable. Each beam is identical.

i)

ii)

iii)
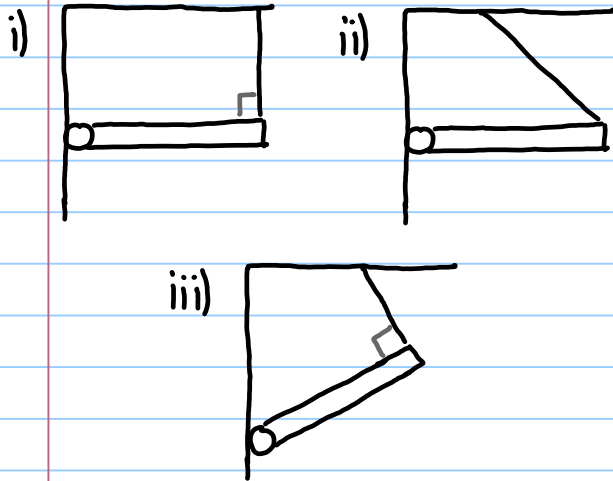
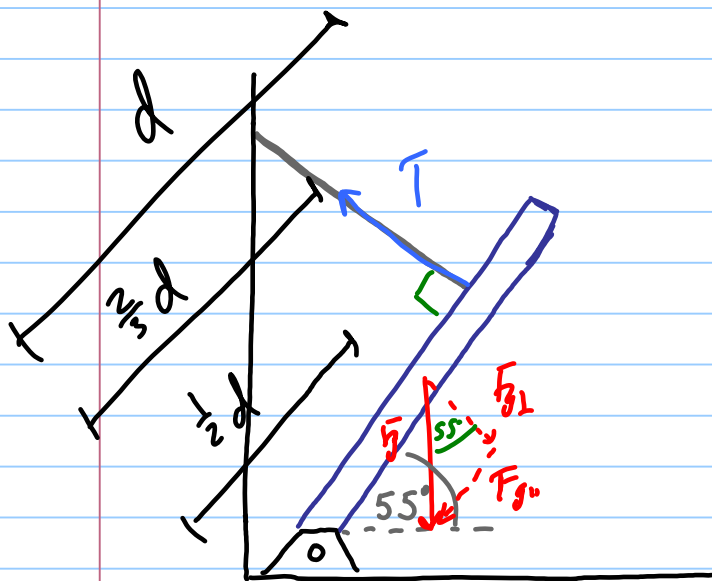2.) A cable is attached 2/3 of the way up a 250 kg boom as shown. What is the tension in the cable?

55°

i)

T_1

$\vec{F_g}$

ii)

T_2

$F_{g\perp}$

$\vec{F_g}$

iii)

T_3

$\vec{F_g}$ $F_{g\perp}$ $F_{g\parallel}$

$$T_3 < T_1 < T_2 \quad \checkmark$$

d

$\frac{2}{3}d$

$\frac{1}{2}d$

T

$\vec{F_g}$ $55°$ $F_{g\perp}$

$55°$ $F_{g\parallel}$

O

$$\tau_c = \tau_{cc} \quad \checkmark$$

$$F_{g\perp}\left(\tfrac{1}{2}d\right) = T\left(\tfrac{2}{3}d\right) \quad \checkmark$$

$$F_{g\perp} = F_g \cos 55° \quad \checkmark$$
$$= mg \cos 55 = 1405\,N$$

$$T = \frac{\tfrac{1}{2} F_{g\perp}}{\tfrac{2}{3}} = \boxed{1050\,N} \quad \checkmark$$