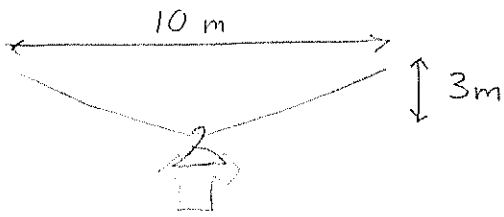


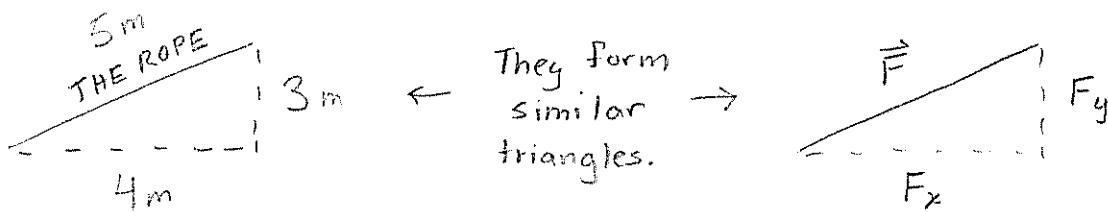
A taut 10 m clothesline sags 3 m under the weight of a shirt. What is the tension in the line?



Think about each section of the line alone — say, the right side. Each side must support $\frac{1}{2}$ of the rope's weight to balance F_g .

$$F_y = \frac{1}{2} mg$$

* The total force \vec{F} exerted by each section of line must be directed along the line itself. So, although we only really need a force F_y along y , we get a force F_x along x so that the direction of this tension force \vec{F} is pointed along the rope.



$$\frac{F_x}{F_y} = \frac{4}{3}$$

$$F_x = \frac{4}{3} F_y = \frac{4}{3} \left(\frac{1}{2} mg \right)$$

$$F = \sqrt{F_x^2 + F_y^2} = \frac{5}{6} mg$$

On the left section, it's the same story with $F_x \rightarrow -F_x$.