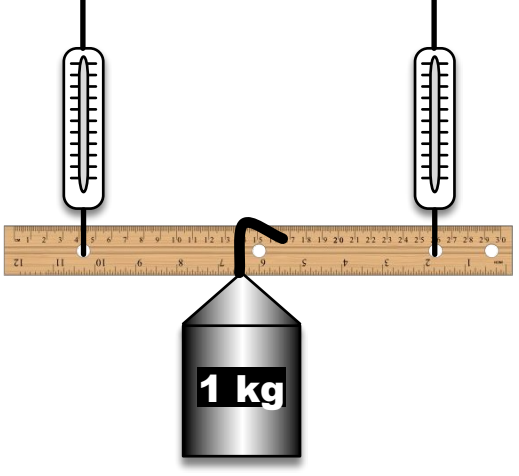
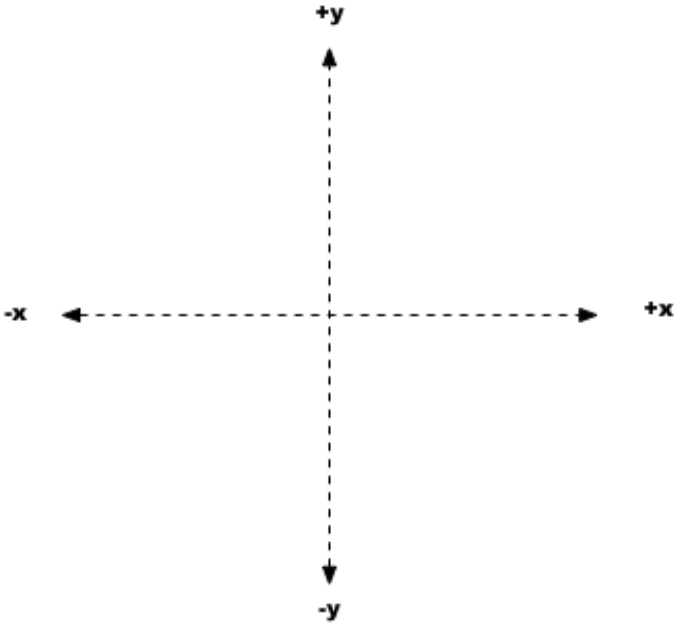


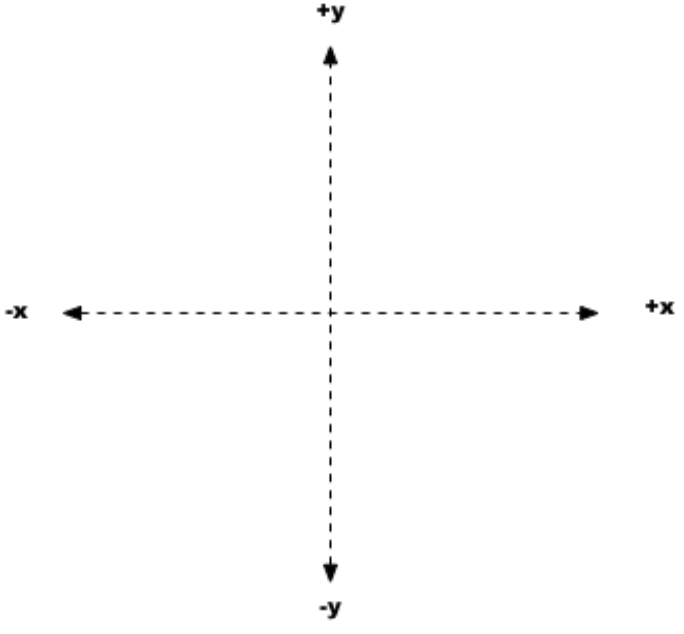
1. Hook two spring scales to the holes equidistant from the ends of the ruler.

2. Hook the 10 N weight so that it hangs in the directly in between the two scales.

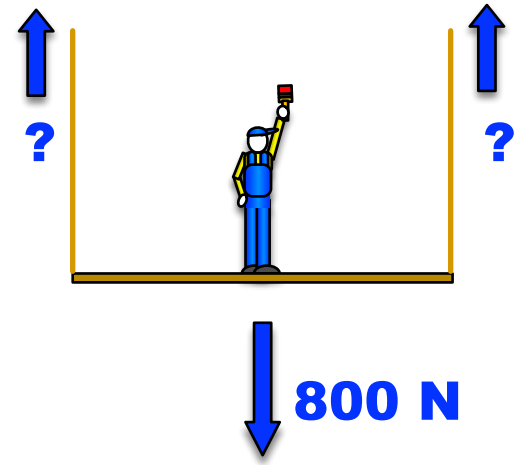
3. What do the two scales read?
Put all three of the forces on the diagram at right.



4. Now move the 10 N weight so that it's closer to one of the scales. How did the readings change? What stayed the same? Once again, put all three of the forces on the diagram below.



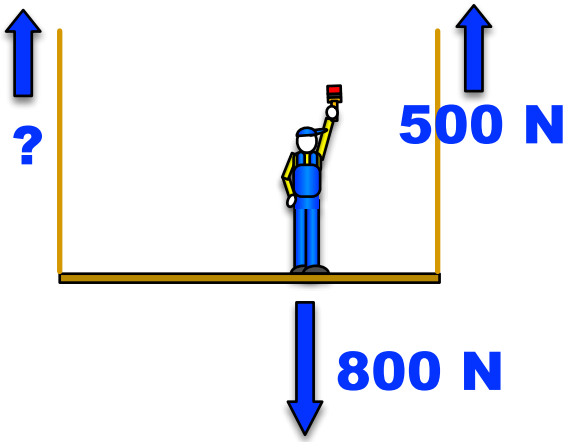
5. What do you think would happen if the put the weight directly under one of the spring scales? Try it.



The painter stands on the scaffold, high up off of the ground. (The scaffold is at rest and has negligible mass.)

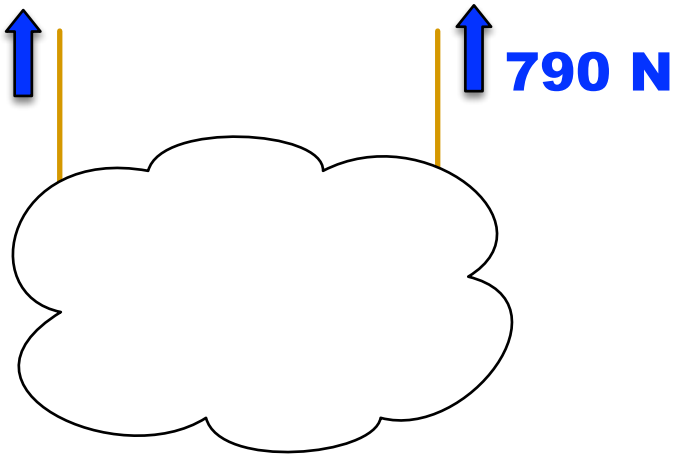
The painter is in the exact middle of the platform. What do you think the tension in each rope will be?

Why do you think that?



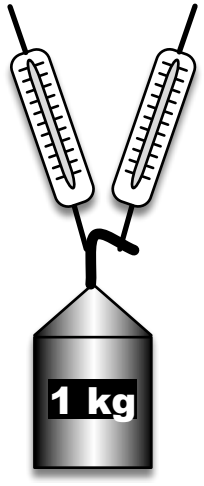
The painter has moved closer to the one side of the scaffold, which is still at rest. What do you think the tension in the other rope will be?

Why do you think that?



Some fog has rolled in. We can't see the 800 N painter, but we know the tension in the one rope is 790 N. What do you think the tension in the other rope is?

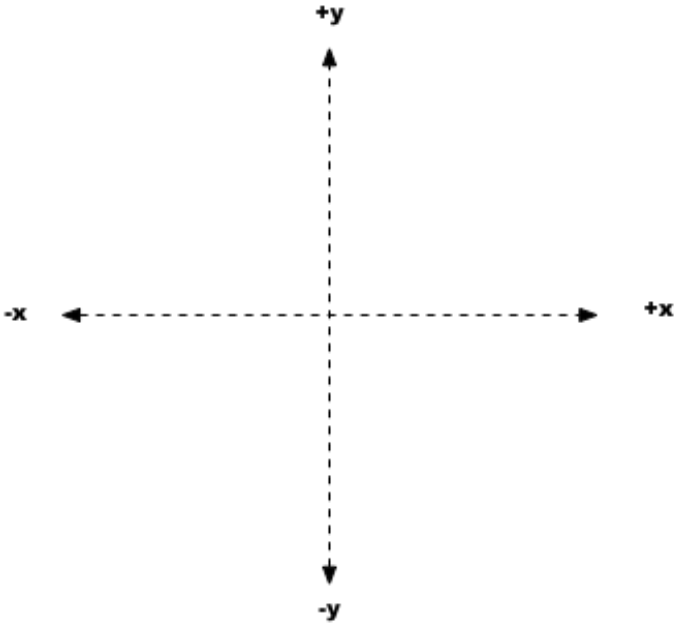
Mark approximately where you think the painter is standing.
Why do you think that?



1. Hook two spring scales to the 10 N weight so that they make a small angle.

2. Do the two readings still add up to be 10 N?

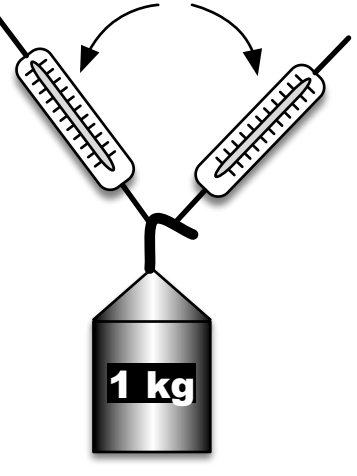
3. Put the readings on the diagram below.
Draw the components on the two spring scale forces.



4. What do the y-components still have to add up to be?

5. How must the x-components compare to each other?

6. Do the x-components help to lift the weight at all?

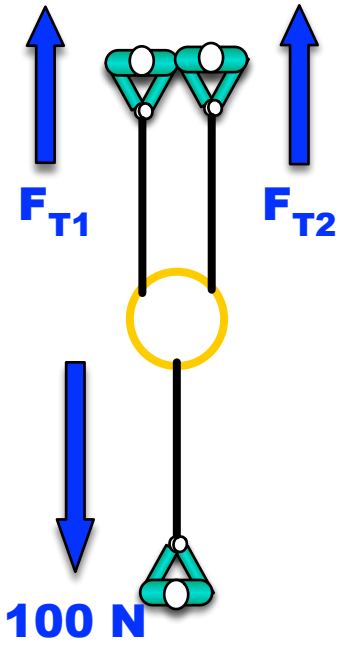


7. Make the angle between the scales larger and larger. What happens to their readings?

8. Are the y-components getting larger? (Think what they have to add up to be.)

9. Are the x-components getting larger?

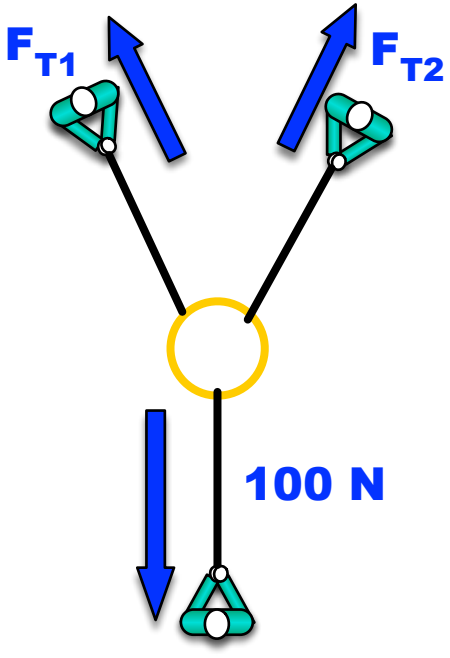
10. If you want to minimize tension when lifting something with two ropes, what should be true of the angle between the ropes?



This is a top view of a three-way tug of war, and it's a tie.

How big do you think F_{T2} and F_{T1} are?

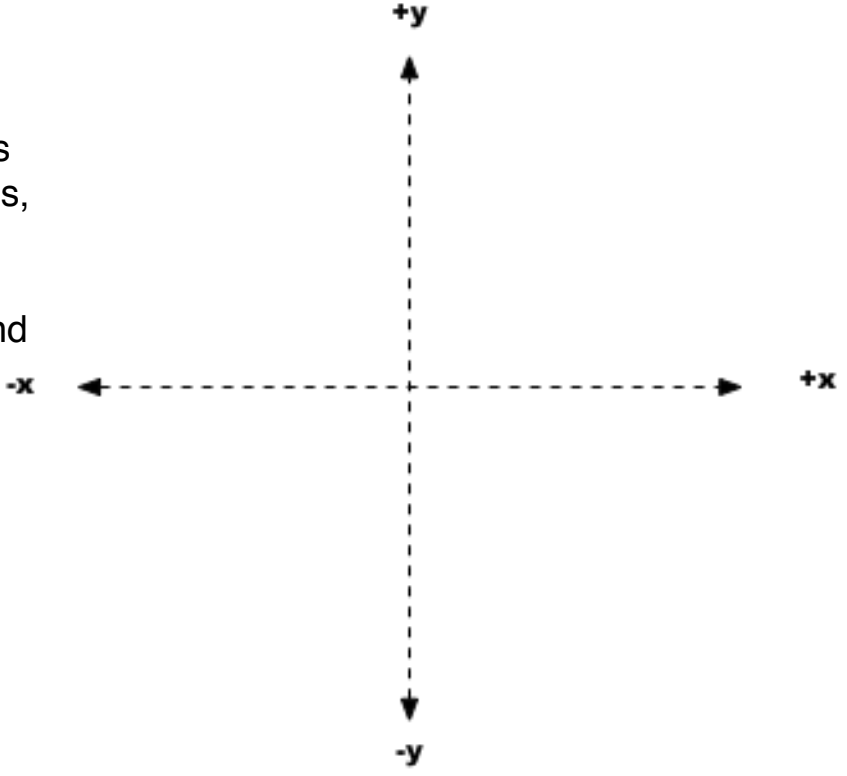
Why do you think that?

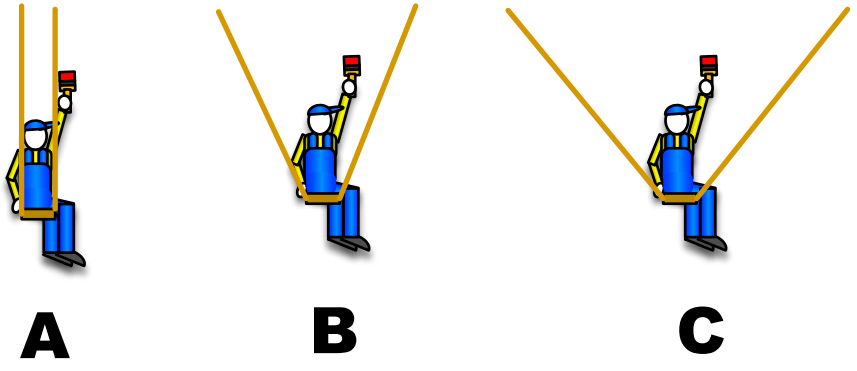


The two pullers have moved apart, but it's still a tie. On the diagram, draw the forces, and draw components.

How big are the y-components of F_{T2} and F_{T1}?

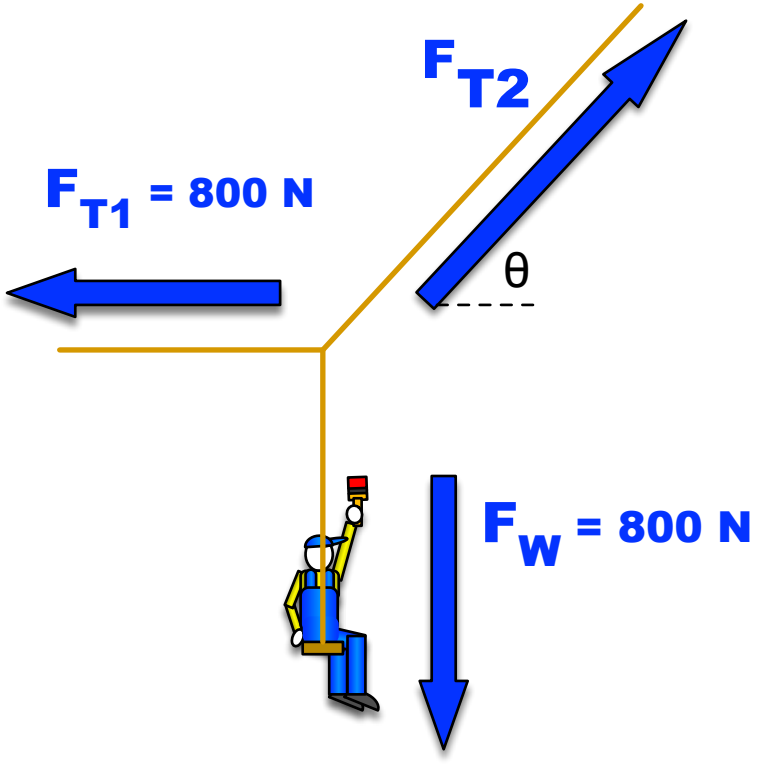
Make up x-components for F_{T2} and F_{T1} that are possible.





The painter's seat is suspended from two ropes and is at rest.

If the painter is worried that the ropes might not be strong enough, are all of these configurations equally safe or is one safer than the others? Why do you think that?



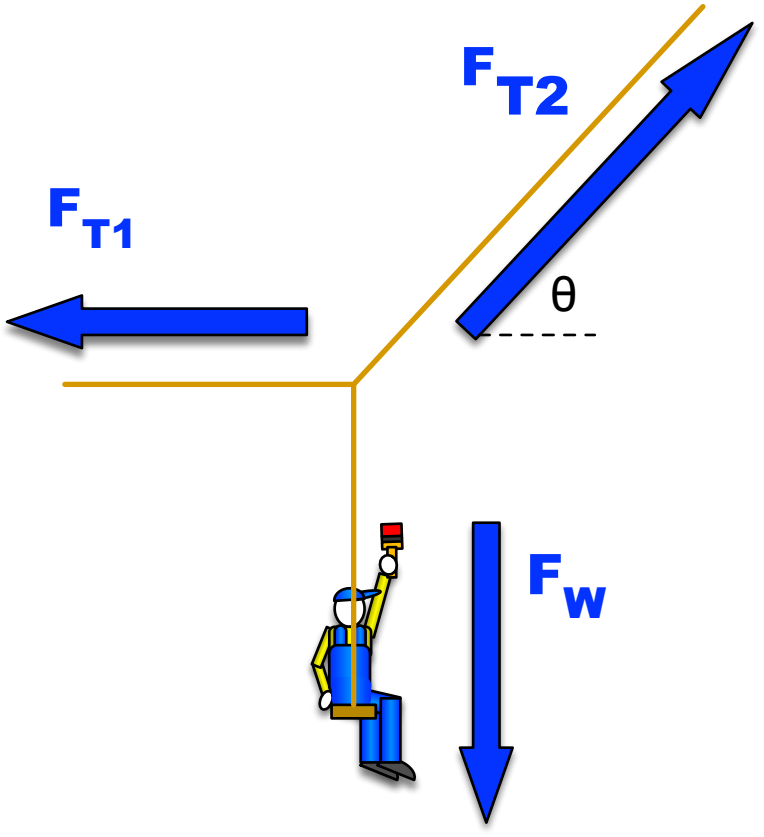
The painter is at rest.
Draw in the x and y components of F_{T2}.

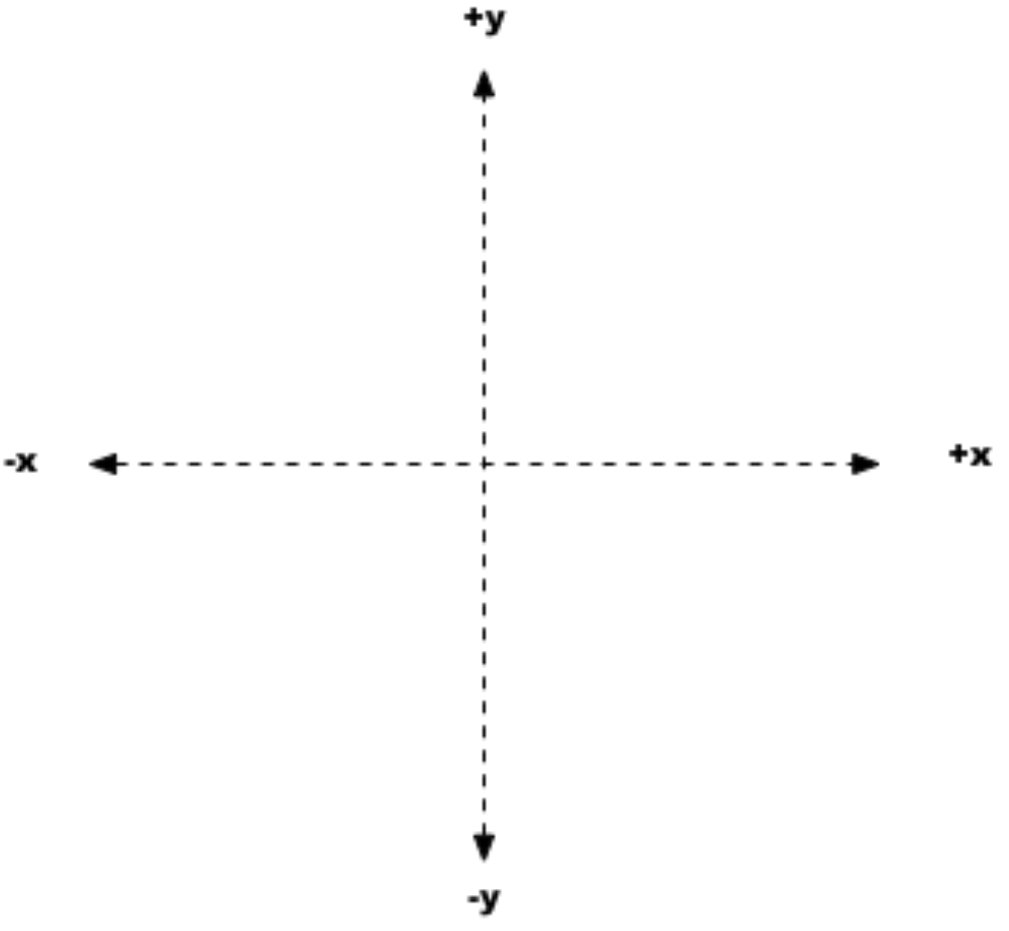
What has to be true of F_W and the y-component of F_{T2}?

What has to be true of F_{T1} and the x-component of F_{T2}?

Solve for F_{T2}.

Determine the angle θ.





The painter is at rest. Draw the forces on the diagram, including components. Make up numbers for the forces and the angle that could be true. Show your work. Make sure to determine how big F_{T2} is.