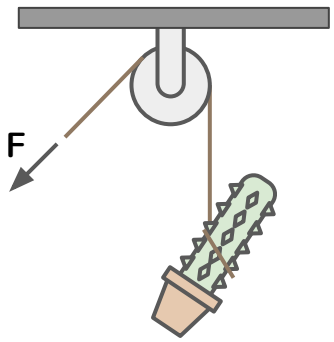
Exam simulation - TECNO

Don't look at your notes when you try to do it for the first time!

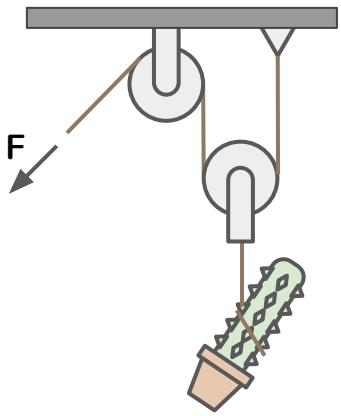
1. Jacob Collier and a really peaceful penguin are playing in a seesaw. Jacob weighs 65 kg and the penguin 35 kg. If the penguin sits 1.3 m far from the fulcrum, where should Jacob sit in order to keep the seesaw balanced? Can we say that Jacob has mechanical advantage?

2. Calculate the force needed to pull the cactus up and the mechanical advantage in each of these situations (the weight of the cactus is 4 kg).

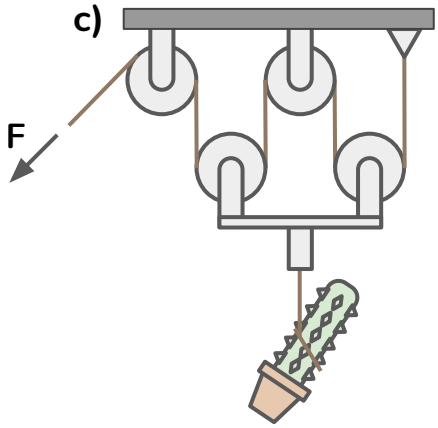
a)



b)

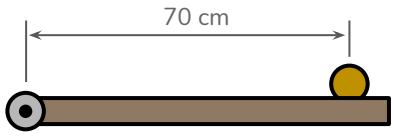


c)



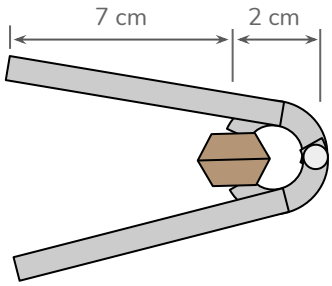
3. We use an inclined plane to raise a load of 63 kg from the ground to a height of 5 m. If the length of the inclined plane is 45 m, how much force will we need to apply?

4. How much moment of force is applied to the door of the drawing if we push the knob with a force of 50 N? How much force should I apply in order to have a moment of 100 Nm?

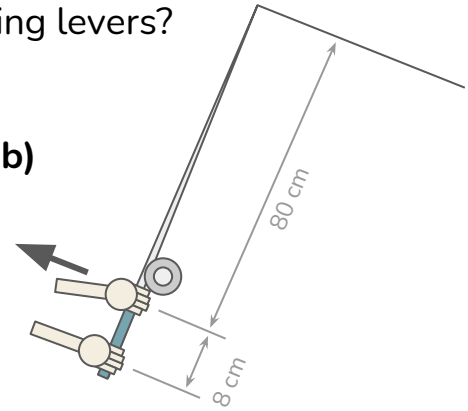


5. What class are the following levers?

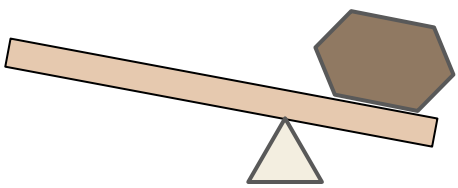
a)



b)

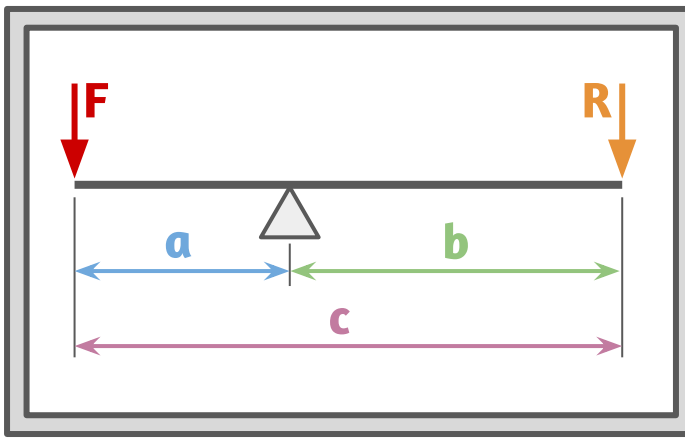


c)



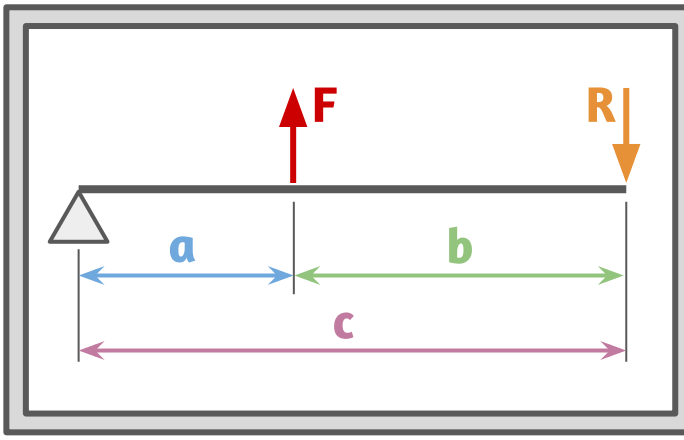
6. Choose the correct formula for each case.

a)



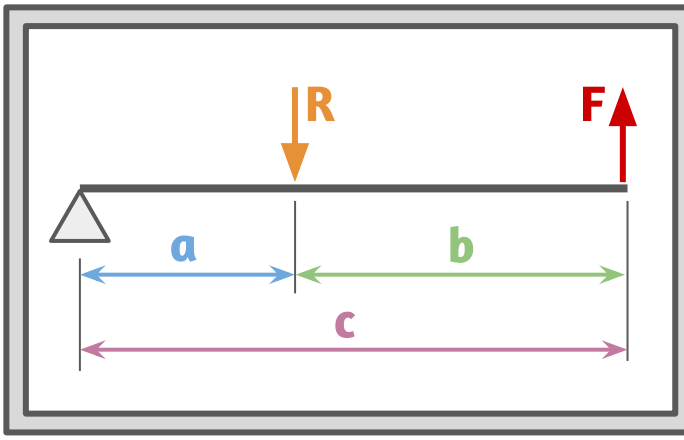
1	$F \cdot a = R \cdot c$
2	$F \cdot a = R \cdot b$
3	$F \cdot R = a \cdot b$
4	$F \cdot b = R \cdot a$

b)



1	$F \cdot a = R \cdot c$
2	$F \cdot a = R \cdot b$
3	$F \cdot R = a \cdot b$
4	$F \cdot b = R \cdot a$

c)



1	$F \cdot a = R \cdot c$
2	$F \cdot c = R \cdot a$
3	$F \cdot R = a \cdot b$
4	$F \cdot b = R \cdot a$

Solucions:

1. 0.7m, he doesn't have advantage (he has to push harder than the penguin).
2. **a)** 4N (no mechanical advantage).
b) 2N (mechanical advantage of 2).
c) 1N (mechanical advantage of 4).
3. 68.87N
4. 35Nm, 142.86N
5. **a)** Second class (the load in the middle)
b) Third class (my force is in the middle)
c) First class (the fulcrum is in the middle)
6. **a)** 2 **b)** 1 **c)** 2