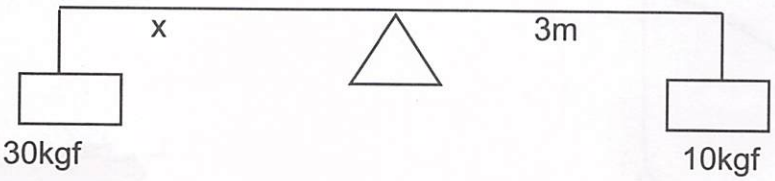
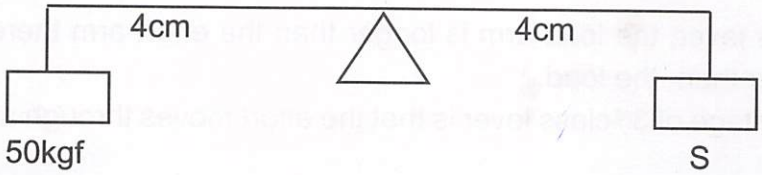
Exercise:

1. Find the length of x

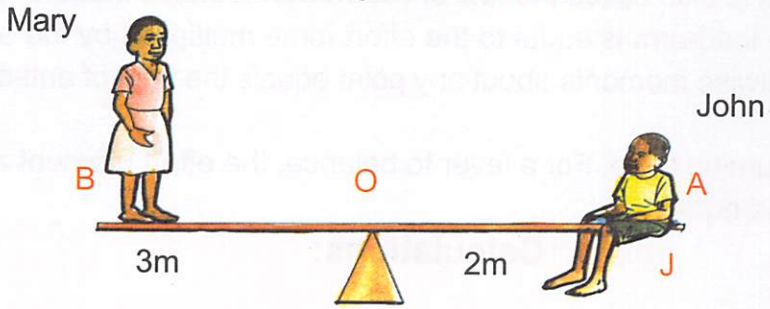


2. Find the weight at s.



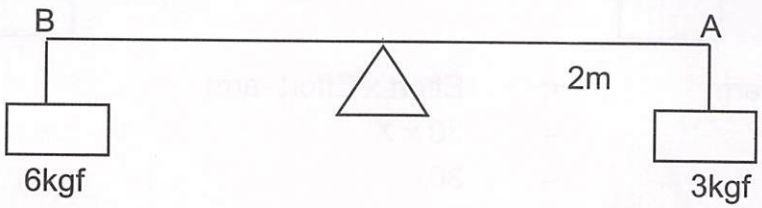
3. A boy and a girl balance on a see saw. A boy weighs 30 kgf and sits 6m from the pivot while a girl who weighs 45 kgf sits x cm from the pivot. Find the distance x in cm. begin with a **sketch.**

4. What is the weight of a girl who sits 5m from the pivot and balances a boy who weighs 60kgf and sits 3cm from the pivot. Begin with a **sketch**.



5. AB is a see-saw 6m long supported at its mid point 0. John of mass 45kgf is seated at J, 2 metres from 0. He is balanced by Mary standing at end B. Find the mass of Mary in kgf.

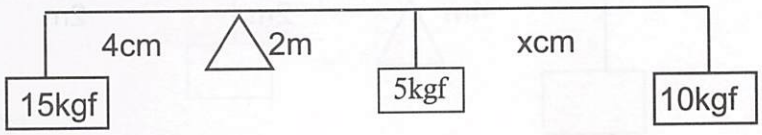
6. Using the see-saw shown below, find the length of the wooden plank AB.



More difficult examples (Be careful)

Example 1

Find the value of x



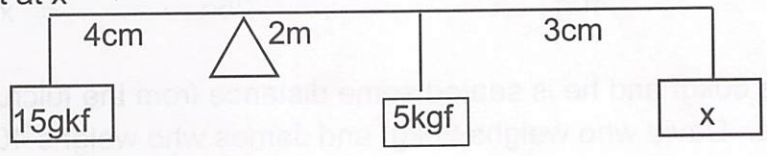
Solution:

L x LA	=	E x EA
15 x 4	=	(5 x 2) + 10 x (2 +x)
60	=	10 + 20 + 10 x
60	=	30 + 10x
60 -30	=	10x
30	=	10x
~~30~~^{3}	=	~~10x~~^{1}
~~10~~$_{1}$	=	~~10~~$_{1}$
3	=	x

Therefore the value of x is 3cm

Example 2:

Find the weight at x



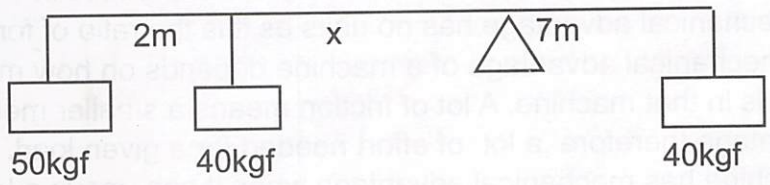
Solution:

L x LA	=	E x EA
15 x 4	=	(5 x 2) + X x (2 +3)
60	=	10 + 2x + 3x
60	=	10 + 5x
60 -10	=	10 - 10 + 5x
50	=	5x
~~50~~^{10}	=	^{1}~~5x~~
~~5~~$_{1}$	=	~~5~~$_{1}$
10	=	x

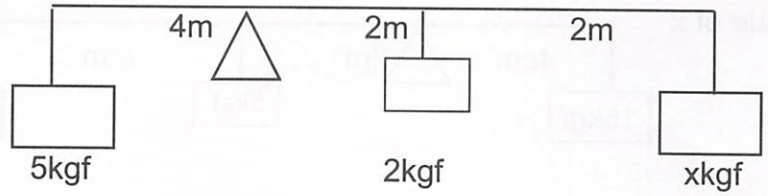
Therefore the weight at x is 10kgf (Compare with example 1)

Exercise: (Be careful)

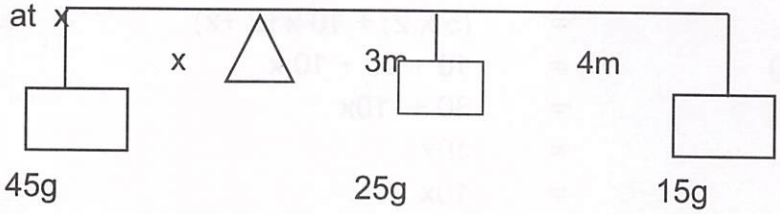
1. Find the value of x



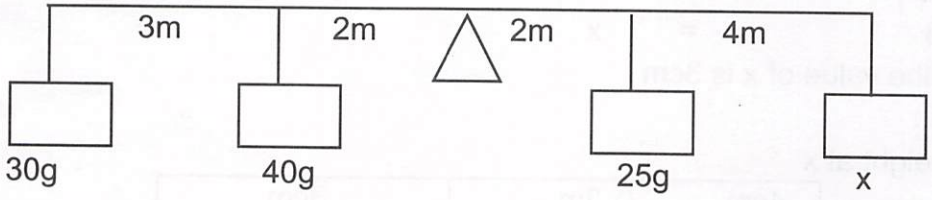
2. Find the weight at x.



3. Find the length at x



4. Find the weight at x.



5. Sam weighs 60kgf and he is seated some distance from the fulcrum. He balances. David who weighs 20kgf and James who weighs 40kgf on the other side of the see-saw with David, seated 2 metres from the fulcrum and James 5 metres from the fulcrum. How far is Sam seated from James

Mechanical advantage of machine:

- Mechanical advantage is the number of times a machine eases a given load. **Or**
- Mechanical advantage of a machine is defined as the ratio of the load to the effort. Mechanical Advantage $= \frac{\text{Load}}{\text{Effort}}$

$$MA = \frac{\text{Load}}{\text{Effort}}$$

- Load and effort are forces therefore they are expressed in **Newtons.**
- So mechanical advantage has no units as it is the ratio of forces.
- The mechanical advantage of a machine depends on how much friction there is in that machine. A lot of friction means a smaller mechanical advantage therefore a lot of effort needed for a given load.
- A machine has mechanical advantage when it can move a load with an effort which is less than the load.