```
                          100 cm

A  ─────────────────────────────────  B

                           1 m
```

Imagine that we measured the distance between A and B in centimeters and recorded a value of 100 cm.

Imagine again that we measured this same distance between A and B in meters and recorded a value of 1 m. As we can tell, only the units are changing, but not the distance between A and B. Since the distance between A and B is fixed, we can write a relationship between the units we measured in. That is, 100 cm = 1 m *(Read as 100 cm is equal to 1 m)*.

From the relationship, we can write two ratios between the units.

To get the first ratio,

we divide through by 100 cm, and the result will be: $\dfrac{\cancel{100\ cm}}{\cancel{100\ cm}} = \dfrac{1\ m}{100\ cm}$ $= 1 = \dfrac{1\ m}{100\ cm}$

Now, we see that the left side of the equal sign has a value of 1. We are not interested in the result 1, we are only interested in the ratio part: **1 m/100 cm.**

To get the second ratio,

we divide through by 1 m, and the result will be: $\dfrac{100cm}{1\ m} = \dfrac{\cancel{1\ m}}{\cancel{1\ m}}$ $= 1 = \dfrac{100\ cm}{1m}$

So, if we ignore the 1, then our ratio is: **100 cm/1 m.**

Now the two ratios: $\dfrac{100\ cm}{1\ m}$ and $\dfrac{1\ m}{100\ cm}$ are called conversion factors.

So why are these two ratios important?

They are important because they will always help us convert from centimeters to meters or from meters to centimeters. Thus, when you know the relationship between two units, you can always use their ratios to convert from one unit to the other.

Having read all that, let's now do some examples.

Question

Your bed is 30 m long. How long is it in cm?

Now, you must ask yourself these questions before you proceed.

First, which units are mentioned in the question? meters and centimeters.

Second, what's their relationship to each other? 100 cm = 1m

Third, what value and unit are given in the question to convert from? = 30 m

Fourth, what unit should your final answer have at the end of the calculation? cm

Now let's use a table to guide us in the calculation.

(1)	(2)	= (4)
(5)	(3)	

For table spot with the number:

(1) we write the value and unit given in the question to convert = 30 m

(2) we write the top value of the ratio with the unit we want

(3) we write the bottom value of the ratio with the unit we want to cancel out. Thus, the unit we are converting from.

(4) our answer: value plus the unit we want.

(5) we always leave blank.

Now calculation

Let's get out ratios: 100 cm/1 m, and 1 m/100 cm. Since we are converting from meters to centimeters, we must pick the ratio with cm on top so that we can cancel out the meters at the bottom of the ratio. So, that is 100 cm/1m. Now let's plug our values in our table

30 ~~m~~	100 cm	= 3000 cm.
	1 ~~m~~	

Notice that, the horizontal line means division, so the meters cancel each other out. Since we have no more units to cancel, we multiply the top numbers together and divide by 1 to get 3000 cm.

Question

You always work out for 1 hour (hr). How long is that in seconds (sec)?

Questions to ask yourself

First, units mentioned in the question: hour and seconds

Second, what's their relationship: 1 hr = 60 min, and 60 sec = 1 min.

1 ~~hr~~	60 ~~min~~	60 sec	= 3600 sec
	1 ~~hr~~	1 ~~min~~	

Note! Once you understand how to do such calculations, using a table like the one above is no longer necessary. Thus, we could have done the above calculation this way:

1 ~~hr~~ * 60 ~~min~~/~~1hr~~ * 60 sec/1~~min~~ = 3600 sec