4.1. Answer the questions:

a. Why is almost impossible to know how many stars are really in the Milky Way?

It is because **we are inside** the Milky Way and our vision is not clear.

b. What galaxies form part of the Local Group?

The Milky Way is part of a group of galaxies called the **Local Group**, formed by 54 galaxies.

The Local Group is divided into two groups:

- 20 galaxies gravitationaly joined to the Milky Way and much smaller the it.
- 15 small galaxies that surround the galaxy M31 (Andromeda).

In addition, there is an elevated number of small galaxies do not related to neither of them.
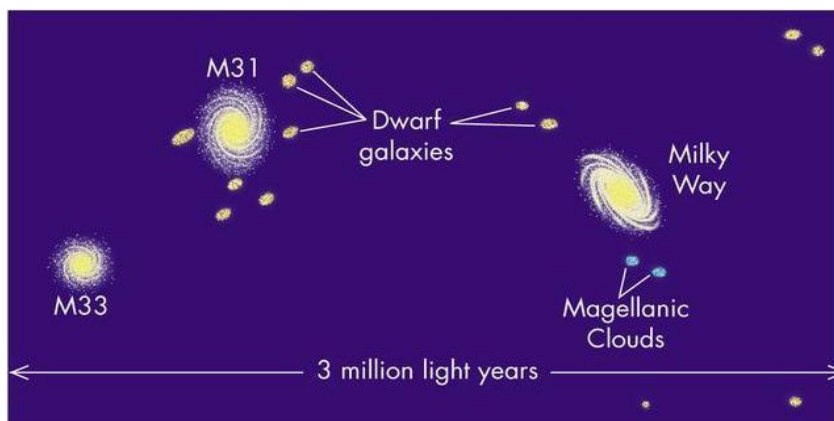
c. Which parts can be distinguished in the Milky Way?

We can distinguish different parts:

- **Centre.** It is occupied by a *supermassive black hole* around which the rest of the elements rotate.
- **Bulge.** It is formed by several millions of old stars very close together.
- **Disc.** It is where the young stars, nebulae, and cosmic dust al located. It is flat-shaped and is formed by four main arms (*Perseus, Sagittarius, Centaurus* and *Cygnus*) and other secondary four ones. In one of these secondary arms (*Orion*), the Solar System is.
- **Halo**. It is spherical-shaped and involves the other parts. It contains globular clusters (formed by very old stars) and isolated stars.
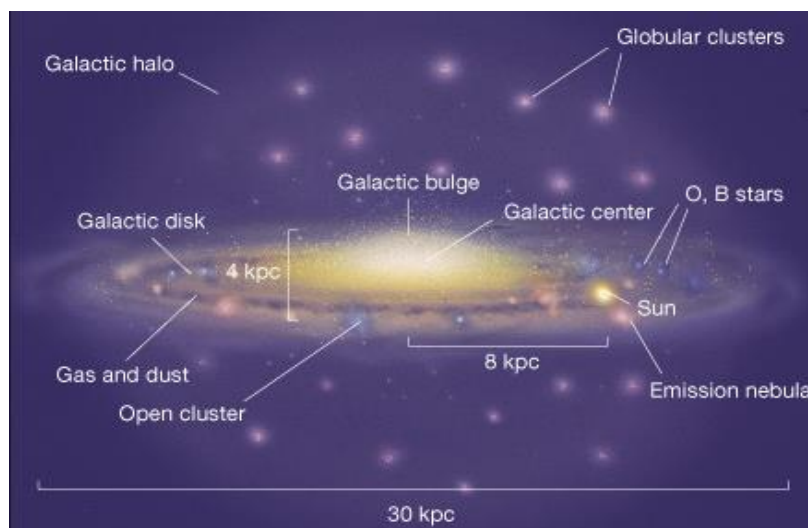
4.2. To measure distances in the space we need bigger units than those used in the Earth.

a. Which unit is used to measure distances within the Solar System? Which one will we use to measure distances between stars? Indicate the equivalence of both in kilometres.

To measure distances within the Solar System we use the **Astronomical Unit**. It is equivalent to 150.10^6 km. To measure distances between stars we use the **Light Year**. This is the distance travelled by light in a year (v_{light} 300.000 km/s). It is equivalent to 9,460,800,000,000 km.

b. Andromeda galaxy is 2.5 million light-years from the Earth. How much time would it take us to arrive there if we could travel at the speed of light?

It would take us 250,000 years.

c. If our spacecraft could only reach 40,000 km/h, how long does the journey be? Express the result in years.

It would take us 67,500,000,000 years.