Data sheet The solar system

This table gives some (approximate) data for the Earth.

The Earth	
Diameter (in km)	12,756.3
Mass (in tonnes)	5,980,000,000,000,000,000,000 (5.98×10^{21})
Radius of orbit (in km)	149,600,000
Period of orbit (days)	365.3
Number of moons	1

The path of a planet around the sun is its orbit. The radius of orbit is the average distance the planet is from the sun as it travels round.

The period of orbit is the length of time the planet takes to go around the sun once. For the Earth, this is a year, which is approximately 365.3 days.

The next table lists these properties for all of the solar system's eight planets.
The planets are listed in order of distance from the Sun.
The diameter, mass, and radius of orbit are all given relative to the Earth.

Planet	Diameter	Mass	Radius of orbit	Period of orbit (Earth years)	Number of moons
Mercury	0.382	0.06	0.387	0.241	none
Venus	0.949	0.82	0.72	0.615	none
Earth	1.00	1.00	1.00	1.00	1
Mars	0.53	0.11	1.52	1.88	2
Jupiter	11.2	318	5.20	11.86	63
Saturn	9.41	95	9.54	29.46	56
Uranus	3.98	14.6	19.22	84.01	27
Neptune	3.81	17.2	30.06	164.8	9

The **inner** planets are Mercury, Venus, Earth and Mars.
The **outer** planets are Jupiter, Saturn, Uranus and Neptune.

Questions The solar system

1

Which is the largest planet?

- -

2

The total mass of the eight planets is approximately 447 Earth masses.

What is the total mass of the four inner planets?
Give your answer to the nearest whole number of Earth masses.

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3

How many Earth days does it take for Mercury to orbit the sun?

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4

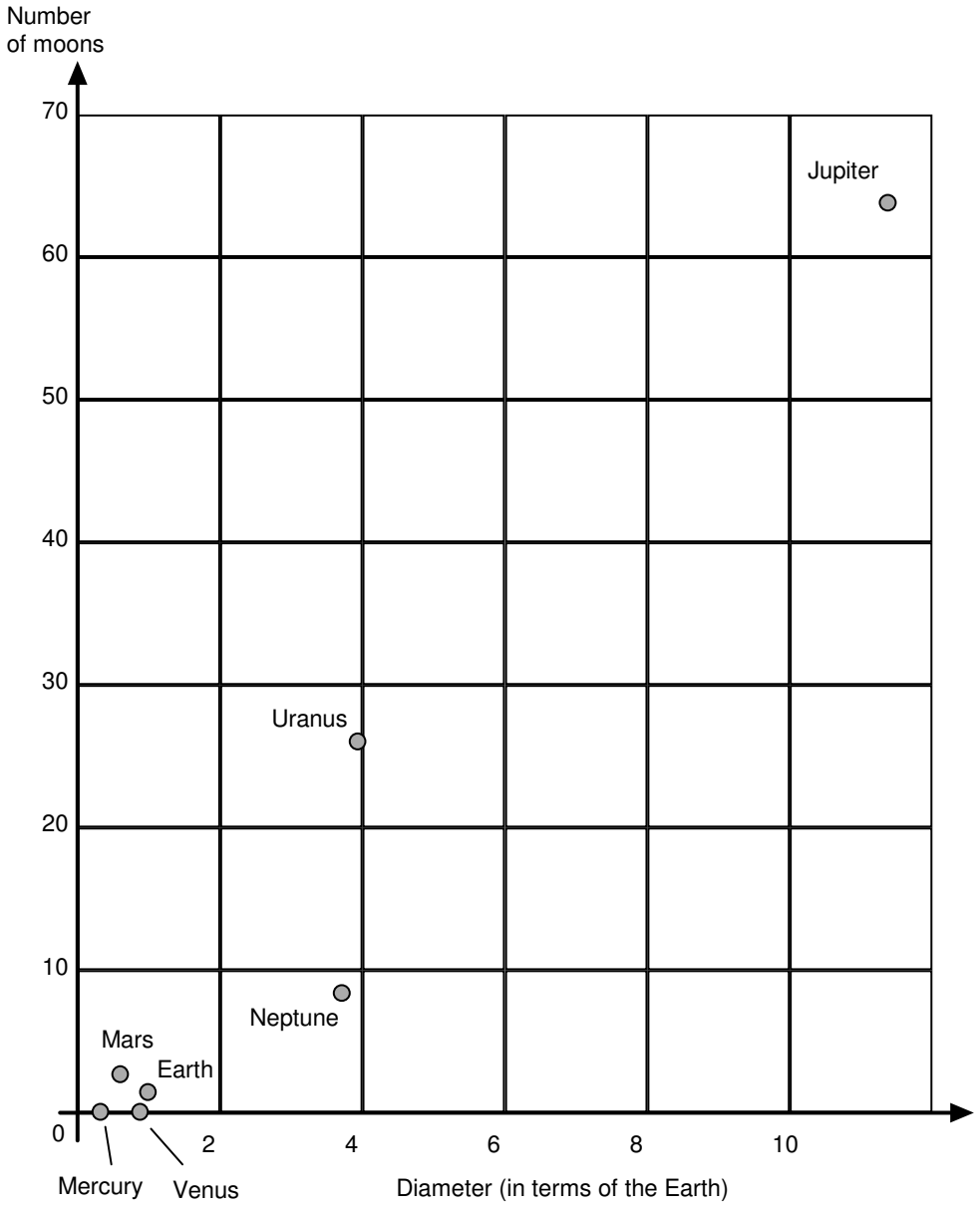
Neptune is the planet furthest from the sun.
Approximately how many kilometres is Neptune from the sun?

- - - - - - - - - - - - - - - - - kilometres

5

This graph shows the diameters of the planets and the number of moons each has.

Saturn is missing from the graph.



(a) Plot the point for Saturn on the graph.

(b) Look at the graph. What seems to be the relationship between the number of moons and the diameter?

6

Kepler's third law says that, for all planets, if *P* is the period of orbit (relative to the Earth) and *R* the radius of orbit (relative to the Earth), then:

$$P^2 = R^3.$$

For example, for Mars, P = 1.88 so P^2 = 3.5 (to one decimal place)
and R = 1.52 so R^3 = 3.5 (to one decimal place)

Pluto is no longer considered be a planet, but nevertheless follows Kepler's law.

The radius of orbit for Pluto (R) is approximately 39.5 times that of the Earth.

Use Kepler's law to estimate the period of Pluto's orbit (P), in Earth years.

Earth years
