

## GS104 equations practice

Use these equations to solve the following problems:

$$p^2 = d^3$$
$$F = G(m_1 m_2) / r^2$$

A planet has a period of 0.24yr, what is its orbital distance from the sun?

A planet has an orbital distance of 1.52 au, what is its period?

A planet has a period of 11.86 yrs, what is its orbital distance from the sun?

Mars has a mass of  $0.6419 \times 10^{24}$  kg and Jupiter has a mass of  $1898.6 \times 10^{24}$  kg. They are  $5.5 \times 10^{11}$  m away from each other. What is the gravitational force between them?

Mercury has a mass of  $3.302 \times 10^{23}$  kg and Neptune has a mass of  $1.02 \times 10^{26}$  kg. The distance between the two is  $4.43 \times 10^{12}$  m. What is the gravitational force between them?

The average distance between earth and the sun is  $1.5 \times 10^{11}$  m. The earth has a mass of  $5.98 \times 10^{24}$  kg and the sun has a mass of  $1.98 \times 10^{30}$  kg. What is the force of gravity between the sun and the earth?