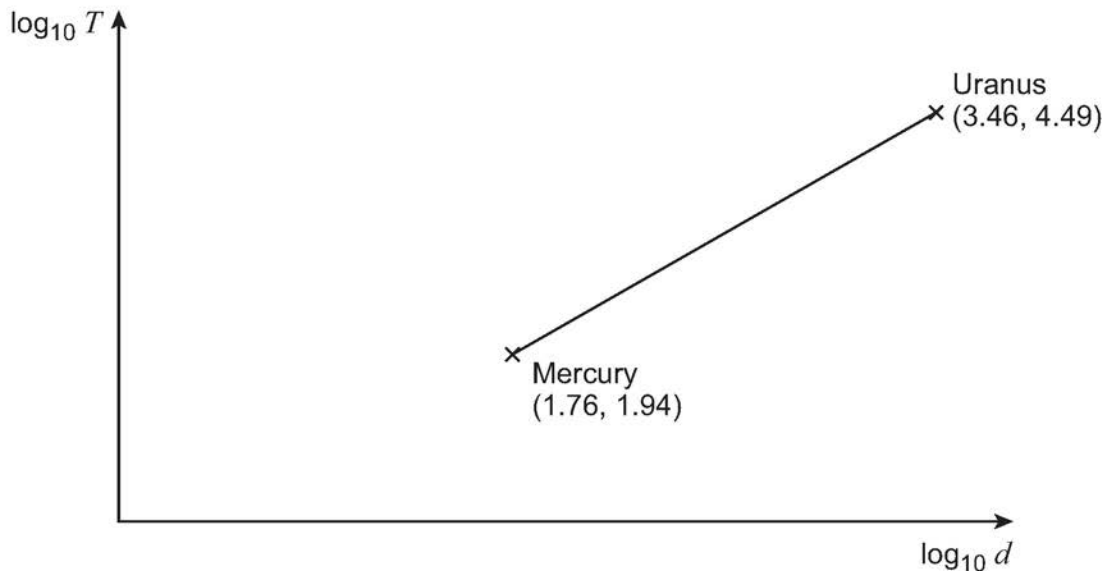


7

A planet takes  $T$  days to complete one orbit of the Sun.

$T$  is known to be related to the planet's average distance  $d$ , in millions of kilometres, from the Sun.

A graph of  $\log_{10} T$  against  $\log_{10} d$  is shown with data for Mercury and Uranus labelled.



**7 (a) (i)** Find the equation of the straight line in the form

$$\log_{10} T = a + b \log_{10} d$$

where  $a$  and  $b$  are constants to be found.

[3 marks]

**7 (a) (ii)** Show that

$$T = Kd^n$$

where  $K$  and  $n$  are constants to be found.

[2 marks]

**7 (b)** Neptune takes approximately 60 000 days to complete one orbit of the Sun.

Use your answer to **7(a)(ii)** to find an estimate for the average distance of Neptune from the Sun.

[2 marks]