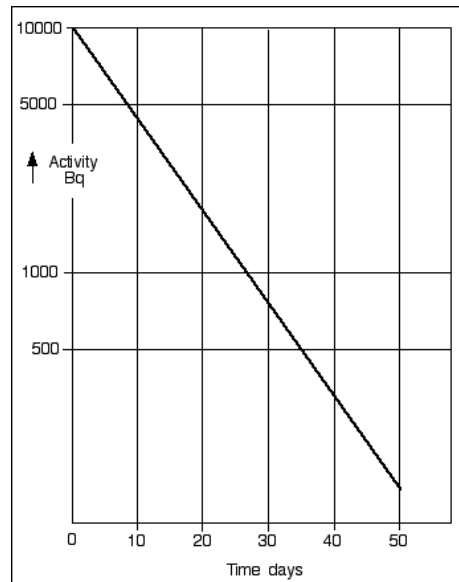


Log graphs

1 The graph below on semi-log paper shows the activity of a radioactive sample over time.



The half-life of the sample is close to ...

- a** 180 days **b** 55 days **c** 28 days **d** 8 day

2 The period T of the earth in near circular orbit round the sun is given by $T^2 = kr^3$... where r is the radius of the orbit and k is a constant.

The slope of a plot of $\log T$ against $\log r$ will be ...

- a** 3/2 **b** 2 **c** 3 **d** 2/3

Note: for this, and similar questions, take logs of both sides of the equation. In this case ... $2 \log T = 3 \log r + \log k$

3 The flow rate U of water in a long pipe is a function of the radius r . If the relationship is a power law of the form $U = kr^n$, a plot of $\log U$ against $\log r$ is a straight line.

In this case the value of $\log k$ is:

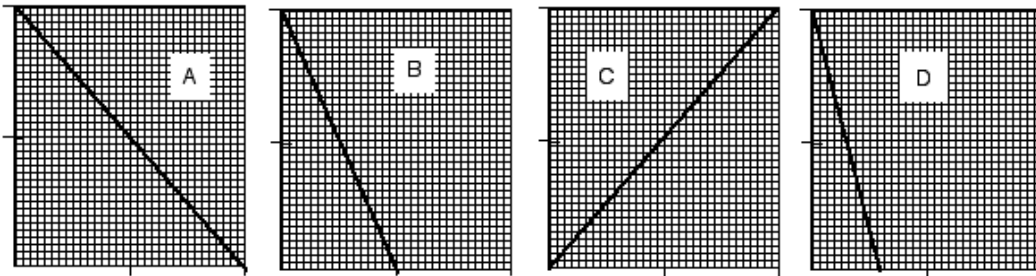
- a** - the slope of the graph. **b** - the inverse of the slope.
c - the intercept on the $\log U$ axis. **d** - the intercept on the $\log r$ axis

4 In an adiabatic change the volume V and pressure P of the gas confined to a cylinder are given by $PV^\gamma = k$ where γ is the ratio of specific heats.

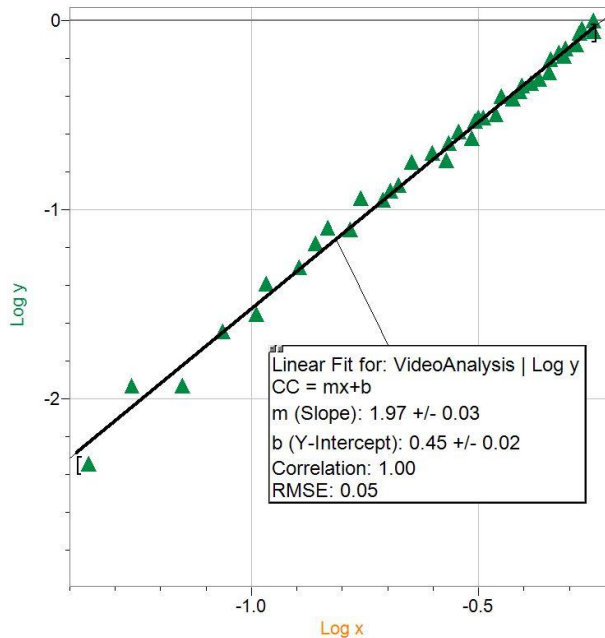
Which graph will be a straight line?

- a P against $\log V$ b $\log P$ against $1/V$ c P against $1/V$ d $\log P$ against $\log V$

5 The gravitational field g near the earth is proportional to the inverse square of the distance r to the centre. Which one of the graphs A to D could not show $\log g$ plotted against $\log r$?



6 The graph below is a plot of $\log y$ against $\log x$ for two variables x and y .



The relationship between x and y can be written as $y = kx^n$.

Find the values of k and n with likely errors.