The half life of radon is 3.80 days. What would be its decay constant?

Solution:

Decay equation:
$$N(t) = N_0 \cdot e^{-\lambda t}$$
$N(t)$ - the quantity at time *t*

$N_0 = N(0)$ is the initial quantity, i.e. the quantity at time *t = 0*.

λ - decay constant

Time required for the decaying quantity to fall to one half of its initial value:
$$t_{1/2} = \frac{\ln 2}{\lambda} = 3.80 \text{ days}$$

Also we need to convert days in seconds.
$$1 day = 24 hours = 24 \cdot 60 \min utes = 24 \cdot 60 \cdot 60 \sec onds$$

$$\lambda = \frac{\ln 2}{t_{1/2}} = \frac{0,69}{3.80 \cdot 24 \cdot 60 \cdot 60} = \frac{0,69}{328320} = 2,1 \cdot 10^{-6}$$

Answer:
Decay constant = $2,1 \cdot 10^{-6}$