

$$k = \frac{\ln(1/2)}{-h} = \frac{\ln(2^{-1})}{-h}$$

$$= \frac{-1 \cdot \ln 2}{-h} = \frac{\ln 2}{h}$$

$$k = \frac{\ln 2}{h}$$

Put this all together:

$$A = A_0 e^{-\left(\frac{\ln 2}{h}\right)t}$$

EXAMPLE The half-life of carbon-14 is 5730 years.

An artifact is found to contain 80% of its original amount of carbon-14. How old is the object?

SOLUTION :

$$A = A_0 e^{-\left(\frac{\ln 2}{h}\right)t}$$

$$A_0 = 1$$

$$A = .8$$

$$h = 5730$$

Find t .

$$.8 = 1 \cdot e^{-\left(\frac{\ln 2}{5730}\right)t}$$

$$.8 = e^{-\left(\frac{\ln 2}{5730}\right)t}$$

$$\ln(.8) = \ln e^{-\left(\frac{\ln 2}{5730}\right)t}$$

$$\ln(.8) = \frac{-\ln 2}{5730} \cdot t$$

$$\frac{5730 \ln(0.8)}{-\ln 2} = t$$

$$t = \frac{5730 \ln(0.8)}{-\ln 2}$$

$$t \approx 1,844.6 \text{ years.}$$

Explanation:

$$\log_2(8 \cdot 16) = \log_2(2^3 \cdot 2^4)$$

$$= \log_2(2^7) = 7$$

What is $\log_2(2^7)$

$$x = \log_2(2^7)$$

write as expon.

$$2^x = 2^7$$

$$x = 7$$

$$= 3 + 4$$

$$= \log_2(2^3) + \log_2(2^4)$$

$$= \log_2(8) + \log_2(16)$$