# Math Diversion 719

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> Adherence to truthfulness in all things is a characteristic
> that God looks for in each of us.
> — The Author

The problem is found at:

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Source: https://www.basic-mathematics.com/
   hard-word-problems-in-algebra.html
Title: #70. The half-life of a medication
 Presenter: Patrick
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## 1 The Problem

The half-life of a medication prescribed by a doctor is 6 hours. How many mg of this medication is left after 78 hours if the doctor prescribed 100 mg?

## 2 Solution

The is a standard formula for such things, given by

$$Q(t) = Q_0 \left(\frac{1}{2}\right)^{t/6}, \tag{1}$$

where I have already accounted for the half-life interval, which is the amount of time required for a quantity to drop to half its current value. In this problem, that's 6 hours.

So, with an initial quantity of 100 mg,

$$\begin{aligned} Q(78) &= (100\,\text{mg}) \left(\frac{1}{2}\right)^{78/6} \\ &= (100\,\text{mg}) \left(\frac{1}{2}\right)^{13} \\ &\approx 0.012\,\text{mg}\,. \end{aligned} \tag{2}$$