Percent Completion Problems

A 1st order reaction is 45% complete in 60. Seconds. Find the rate of the rate constant and the half-life of the reaction.

45% complete means that 55% is left still to react

[A] (*any concentration unit*)	Time (s)
100	0
55	60.

$$\ln[A]_t - \ln[A]_o = -kt$$

$$\ln[55]_{60} - \ln[100]_o = -k \times 60s$$

$$k = 0.010\ s^{-1}$$

Rod says not to memorize the half-life equation, but he's wrong about that for the AP Chem exam.
You can use the half-life equation for most of the 1st order reaction rate problems.
And when you can use it, it's faster and decreases your chances of error