

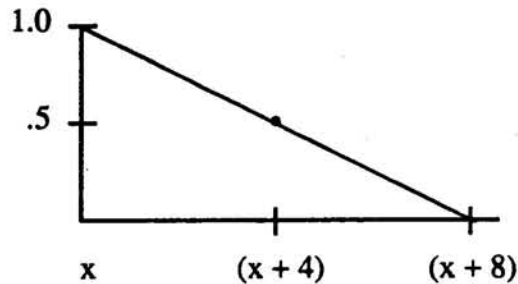
# Homework # 1

## Answers

1. In order to sustain the neutron chain reaction, the neutrons must be thermalized. This takes time. Some degree of thermalization is needed even in a fast breeder reactor. The required time, while brief on a human scale, is so long that the energy needed by a weapon could not be generated.

2.  $\text{Counts} = \frac{S_0}{1-K} = \frac{100}{1-.75} = 400 \text{ cpm}$

3. The reactor will achieve criticality if the blades are withdrawn by another four inches. To see this, make a '1/M' plot.



4. 7.0 inches

5.  $P = P_0 e^{t/\tau}$

$$\ln\left(\frac{100}{50}\right) = t / 200$$

$$138.6 \text{ s} = t$$

6. PuBe sources are doubly encapsulated in stainless steel and will melt if power exceeds a few hundred Watts.
7. Criticality is approached slowly in order to allow time for subcritical multiplication to occur.