Last updated August 24, 2018.

1. [First Pass; 3.F01.37] For watches produced by a certain manufacturer:

   - Lifetimes follow a single-parameter Pareto distribution with $\alpha > 1$ and $\theta = 4$.
   - The expected lifetime of a watch is 8 years.

   You are given the following information about a single-parameter Pareto:

   - $f(x) = \frac{\alpha\theta^\alpha}{x^{\alpha+1}},\ x > \theta$
   - $F(x) = 1 - \left(\frac{\theta}{x}\right)^\alpha,\ x > \theta$
   - $E[X] = \frac{\alpha\theta}{\alpha-1}$

   Calculate the probability that the lifetime of a watch is at least 6 years.

   A. 0.44 B. 0.50 C. 0.56 D. 0.61 E. 0.67