

MATH 3630 - Actuarial Mathematics I  
Fall 2016 - Valdez  
Quiz No. 1  
Wednesday, 8 September 2016

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Suppose you are given the following survival function of a newborn:

$$S_0(x) = 1 - \left(\frac{x}{100}\right)^2, \text{ for } 0 \leq x \leq 100.$$

Calculate the probability that a 20-year-old will survive to reach age 50.

$$\begin{aligned} \Pr(X > 50 | X > 20) &= \frac{\Pr(X > 50, X > 20)}{\Pr(X > 20)} \\ &= \frac{\Pr(X > 50)}{\Pr(X > 20)} = \frac{S_0(50)}{S_0(20)} \\ &= \frac{1 - (1/2)^2}{1 - (1/5)^2} = \frac{3/4}{24/25} \\ &= \frac{75}{96} = \underline{\underline{0.78125}} \end{aligned}$$