1. **Solution of 5.13 pp225:***

   $X$ is a uniform R.V on $(0,30)$ hence its density function is given by
   
   \[
   f(x) = \begin{cases} 
   \frac{1}{30} & \text{if } x \in (0,30), \\
   0 & \text{otherwise}
   \end{cases}
   \]

   And its distribution function is given by
   
   \[
   F(x) = \begin{cases} 
   0 & \text{if } x \leq 0, \\
   \frac{x}{30} & \text{if } x \in (0,30), \\
   1 & \text{if } x \geq 30.
   \end{cases}
   \]

   (a) \[P(X > 10) = \int_{10}^{30} \frac{dx}{30} = \frac{30 - 10}{30} = \frac{2}{3}.
   \]

   (b) \[P(X > 25 | X > 15) = \frac{P(X > 25)}{P(X > 15)} = \frac{\int_{25}^{30} \frac{dx}{30}}{\int_{15}^{30} \frac{dx}{30}} = \frac{5}{15/30} = \frac{1}{3}.
   \]

2. **Solution of 5.19 pp225:***

   $X$ is a normal random variable with mean 12 and variance 4, then
   
   \[Z = \frac{X - 12}{2}\]

   is a standard normal random variable. Hence,

   \[0.90 = 1 - 0.10 = 1 - P(X > c) = P(X < c)\]

   \[P \left( \frac{X - 12}{2} < \frac{c - 12}{2} \right) = P \left( Z < \frac{c - 12}{2} \right)\]

   \[= \phi \left( \frac{c - 12}{2} \right).\]

   Hence, we are looking for a point $\frac{c - 12}{2}$ such that its standard distribution is equal to 0.90. Using the table in page 201, we get that $\frac{c - 12}{2}$ is approximately equal to 1.28 which gives that $c \approx (1.28)2 + 12 \approx 14.56$.

3. **Solution of 5.32 pp226:***

   The time $T$ is an exponential random variable with parameter $\lambda = \frac{1}{2}$, hence its density function is given by

   \[
   f(t) = \begin{cases} 
   \frac{1}{2}e^{-t/2} & \text{if } t \geq 0, \\
   0 & \text{if } t < 0.
   \end{cases}
   \]
(a) 

\[ P(T > 2) = \int_{2}^{\infty} f(t)dt = \frac{1}{2} \int_{2}^{\infty} e^{-t/2} \]

\[ = -e^{-t/2}\big|_{2}^{\infty} = e^{-1}. \]

(b) 

\[ P(T > 10|T > 9) = \frac{P(T > 10)}{P(T > 9)} = \frac{\left(\int_{10}^{\infty} f(t)dt\right)}{\left(\int_{9}^{\infty} f(t)dt\right)} \]

\[ = \frac{-e^{-t/2}|_{10}}{-e^{-t/2}|_{9}} \]

\[ = e^{-1/2}. \]