Stat 345 Solutions - Section 5.3 (2^{nd} ed.)/4.3 (3^{rd} ed.)

Problem 5-10/4-11

(a) $P(X < 2.8) = F(2.8) = 0.2(2.8) = 0.56$
(b) $P(X > 1.5) = 1 - P(X \leq 1.5) = 1 - F(1.5) = 1 - 0.2(1.5) = 0.7$
(c) $P(X < -2) = F(-2) = 0$
(d) $P(X > 6) = 1 - P(X \leq 6) = 1 - F(6) = 1 - 1 = 0$

Problem 5-12/4-13

$P(X \leq x) = \int_{-\infty}^{x} e^{-u} du = -e^{-u}|_0^{\infty} = 1 - e^{-x}$

So the cdf of X is

$$F(x) = \begin{cases} 0, \text{for } x < 0 \\ 1 - e^{-x}, \text{for } x \geq 0 \end{cases}$$

Problem 5-17/4-19

We take the derivative to get the pdf:

$$f(x) = \begin{cases} 0, x < 0 \\ 0.2, 0 \leq x < 4 \\ 0.04, 4 \leq x < 9 \\ 0, x \geq 9 \end{cases}$$

We can check that this is a valid density function:

$\int_0^9 f(x)dx = 0.2(4) + 0.04(5) = 1$