

Stat 345 Solutions Section 4.3

Problem 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 4-13

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

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 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:

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