Math 327 Homework 3 Anchu A. Lee
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Question 3.4
$S = \{HHH, THHH, HTHHH, TTHHH, TTTHHH, HTTHHH, THTHHH, HHTHHH\}$
S is discrete because you cannot flip a fraction of a heads or tails.

Question 3.10
The probability of rolling any side of a fair six sided die is $\frac{1}{6}$, so the formula for probability distribution is $f(x) = \frac{1}{6}$ for $x = 1, 2, 3, 4, 5, 6$ Equal chance of getting any side.

Question 3.12

- $P(T = 5) = F(5) - F(4) = \frac{1}{4}$
- $P(T > 3) = 1 - F(3) = \frac{1}{2}$
- $P(1.4 < T < 6) = F(6) - F(1.4) = \frac{1}{2}$
- $P(T \leq 5 \mid T \geq 2) = \frac{P(2 \leq T \leq 5)}{P(T \geq 2)} = \frac{F(5) - F(2)}{1 - F(2)} = \frac{2}{3}$

Question 3.14
$x = \frac{12}{60}$

- $F(x) = F(0.2) = 1 - e^{-8(0.2)} = 0.79810...$
- $f(x) = \frac{dF}{dx} = 8e^{-8x}$ when $x > 0$
  $\int_0^{0.2} f(x)dx = \int_0^{0.2} 8e^{-8x}dx = 8\int_0^{0.2} e^{-8x}dx = -e^{-8x}\Big|_0^{0.2} = 0.79810...$

Question 3.18

- $P(X < 4) = \int_2^4 \frac{2(1+x)}{27}dx = 0.59259...$
- $P(3 \leq X < 4) = \int_3^4 \frac{2(1+x)}{27}dx = 0.33333...$

Question 3.20
$F(x) = \int_2^x \frac{2(1+t)}{27}dt = \frac{2}{27} \cdot \int_2^x 1 + tdt = \frac{2}{27}\ (t + \frac{t^2}{2})\Big|_2^x = \frac{(x+4)(x-2)}{27}$
$P(3 \leq X < 4) = F(4) - F(3) = \frac{(4+4)(4-2)}{27} - \frac{(3+4)(3-2)}{27} = 0.33333...$
Question 3.24
Question 3.30
Question 3.32
Question 3.38
Question 3.40
Question 3.44
Question 3.46
Question 3.50
Question 3.68
Question 3.80

$$\frac{\frac{1}{\frac{x}{5}}}{1+\frac{x}{7}}\Bigg|_{-5}^{17}$$