Homework 6

BSTA 550

Directions

Please turn in this homework on Sakai. Please submit your homework in pdf format. You can type your work on your computer or submit a photo of your written work or any other method that can be turned into a pdf. The Adobe Scan phone app is an easy way to scan photos and compile into a PDF. Please let me know if you greatly prefer to submit a physical copy. We can work out another way for you to turn in homework.

Try to complete all of the problems listed below at some point this quarter! You may want to save some of them for studying later! Only turn in the ones listed in the "Turn In" column. Please submit problems in the order they are listed.

You must show all of your work to receive credit.

Chapter	Turn In	Extra Problems
Calculus Review		NTB # 1
24	TB # 19, 20*	# 2, 3, 7, 17, 18, 22, 23

*Also find the cdf $F_X(x)$

Non-textbook problems (NTB)

1. Calculus Review

   a. $$\int_0^y c(x+y)dx$$

   b. $$\frac{d}{dx}\left(\frac{4}{9}x^2y^2 + \frac{5}{9}xy^4\right)$$

c.
$$\frac{d}{dy}\left(\frac{4}{9}x^2y^2+\frac{5}{9}xy^4\right)$$

d.
$$\int_0^y 2e^{-x}e^{-y}dx$$

e.
$$\int_0^\infty xye^{-(x+y)}dy$$

f.
$$\int_x^{2x} 2e^{-(x+3y)}dy$$

g. Find the area of the region bounded by the graphs of $f(x)=2-x^2$ and $g(x)=x$ by integrating with respect to x.
h. Find the area of the region bounded by the graphs of $f(x)=2-x^2$ and $g(x)=x$ by integrating with respect to y.
i. Find the area of the region bounded by the graphs of $x=3-y^2$ and $y=x-1$ by integrating with respect to x.
j. Find the area of the region bounded by the graphs of $x=3-y^2$ and $y=x-1$ by integrating with respect to y.

Some select answers

Selected answers (or hints) not provided at the end the book:

- Calculus Review
  - (a) $c(\frac{y^2}{2}+y^2)$
  - (b) $\frac{8}{9}xy^2+\frac{5}{9}y^4$
  - (c) $\frac{8}{9}x^2y+\frac{20}{9}xy^3$
  - (d) $-2e^{-2y}+2e^{-y}$
  - (e) xe^{-x}
  - (f) $-\frac{2}{3}(e^{-7x}-e^{-4x})$
  - (g) $\frac{9}{2}$
  - (h) $\frac{9}{2}$
  - (i) $\frac{9}{2}$
  - (j) $\frac{9}{2}$

- Chapter 24
  - # 2: (a) Discrete (b) Discrete (c) Continuous
  - # 22:

$$f_X(x) = \begin{cases} 0 & x < 0 \\ \frac{7x}{4} & 0 \le x \le 1 \\ 0 & 1 < x < 7 \\ \frac{1}{8} & 7 \le x \le 8 \\ 0 & x > 8 \end{cases}$$

- Chapter 25
  - # 4: 7/16
  - # 8: (a) $\frac{25}{228}$ (b) $f_X(x) = \frac{1}{12}(x+1)$, for $0 \le x \le 4$ (c) $f_Y(y) = \frac{3}{76}(y^2+1)$, for $0 \le y \le 4$
  - # 18: 5/6
  - # 24: (a) $f_X(x) = -2e^{-2x} + 2e^{-x}$, for $x \ge 0$ (b) $f_Y(y) = 2e^{-2y}$, for $y \ge 0$
- Chapter 26
  - # 12: (b) $\frac{233}{256}$ (c) $\frac{65}{256}$ (d) $\frac{1}{512}$
  - # 20: (a) Yes. (b) $\frac{15}{16}$
  - NTB # 3: (b) 0.09999546 (d) $f_Z(z) = \left(\frac{11}{5} - \frac{2z}{5}\right)e^{-2z}$, for what values of z?
- Chapter 27
  - # 6: $f_{X|Y}(x|y) = \frac{e^{-x/4-y/5}}{4(e^{-y/5}-e^{-9y/20})}$, for $0 < x < y$
  - # 8: $f_{X|Y}(x|y) = \frac{1-x^2}{1-y-\frac{(1-y)^3}{3}}$, for $0 \le x, 0 \le y, x+y \le 1$
  - # 12: (a) $f_{X|Y}(x|y) = \frac{1}{2}$ (c) $\frac{4}{7}$