Homework for Math 323

Homework is due at the beginning of each class on the dates specified below.

Assignment 1: due W 1/26, covers Sections 2.2-2.4

W 1/19: Exercises 2.1, 2.2, 2.4(two sets only)
F 1/21: Exercises 2.5-2.9 (2.6e should be $P(A \cup \overline{B})$)
M 1/24: Exercises 2.11-2.24

Assignment 2: due W 2/2, covers Sections 2.5, 2.6, 3.1

W 1/26: Exercises 2.27, 2.28, 2.32, 2.34-2.37, 2.42, 2.43
F 1/28: Exercises 2.38-2.40, 2.51, 2.52, 2.56-2.63, 2.69, 2.78
M 1/31: Exercises 3.1-3.3, 3.6, 3.8-3.10

Assignment 3: due W 2/9, covers Sections 3.2-3.4

W 2/2 and F 2/4: Exercises 3.11, 3.15-3.17, 3.19-3.22
M 2/7: Exercises 3.23-3.30, 3.32, 3.36-3.38

Assignment 4: due W 2/23, covers Sections 3.5-3.8

W 2/16: Exercises 3.40-3.53
F 2/18: Exercises 3.54-3.63, 3.66, 3.68, 3.69a
M 2/21: Exercises 3.70, 3.71, 3.73, 3.74, 3.78, 3.79, 3.81, 3.119

Assignment 5: due W 3/1, covers Sections 4.1-4.3

W 2/23: Exercises 4.1-4.3, 4.5-4.8
F 2/25: Exercises 4.9, 4.10, 4.13, 4.15-4.17, 4.20, 4.21, 4.24, 4.27-4.29

Assignment 6: due W 3/8, covers Sections 4.4-4.6

M 2/28: Exercises 4.30-4.34, 4.35a, 4.38, 4.42-4.44

W 3/1: Exercises 4.45, 4.47, 4.48, 4.52. Also do:
1. Let X and $Y = X^2$ be positive continuous random variables with continuous densities f and g respectively. Find f in terms of g and then g in terms of f.

F 3/3: Exercises 4.55-4.57, 4.61, 4.67, 4.68. Also do:
2. Let X be a continuous random variable with a symmetric continuous density f, such that X^2 has an exponential density with parameter θ. Find f. (A density function f is symmetric if $f(-x) = f(x)$.)

Assignment 7: due W 3/29, covers Sections 4.7, 4.8, 4.10, 5.1

M 3/20: Exercises 4.73, 4.74, 4.77, 4.78. Also do:
1. Let X be a normal random variable with parameters μ and σ. Find the density function of $Y = e^X$.

W 3/22: Exercises 4.81, 4.90, 4.95-4.98, 4.124

F 3/24 & M 3/27: Exercises 5.1, 5.2, 5.4, 5.7, 5.45, 5.50. Also do:
2. Let X, Y be continuous random variables with joint probability density function $f(x, y)$. Let $Z = X + Y$. Find the probability density function $g(z)$ of Z. (Ans: $g(z) = \int_{-\infty}^{\infty} f(z-y, y)dy = \int_{-\infty}^{\infty} f(x, z-x)dx$)

Assignment 8: due W 4/5, covers Sections 5.2-5.4

W 3/29: Exercises 5.5, 5.6, 5.8-5.10, 5.12, 5.13, 5.16
F 3/31 & M 4/3: Exercises 5.17, 5.18a, 5.20a, 5.23, 5.57, 5.74

Assignment 9: due W 4/12, covers Sections 5.5-5.7, 6.2

W 4/5: Exercises 5.26-5.28, 5.31, 5.33, 5.36-5.38, 5.40, 5.64. Also do:
1. Let X, Y be independent random variables, each with a normal density with mean $\mu = 0$ and variance σ^2. Find $P(X^2 + Y^2 \leq 1)$. (Hint: use polar coordinates.)
2. Let a point be chosen in the plane in such a manner that its X and Y coordinates are independently distributed according to a normal density with mean $\mu = 0$ and variance σ^2. Find the density function for the random variable R which denotes the distance from the point to the origin. (This occurs in electrical engineering and it is called the Rayleigh density.)

F 4/7: Exercises 6.2, 6.4, 6.5a, 6.39, 6.46

Assignment 10: due W 4/26, covers Sections 6.3-6.6

M 4/17 & W 4/19:
Sections 6.3 and 6.4: Exercises 6.6a, 6.7a (in these two use transformation method), 6.11, 6.30c,d, 6.34a, 6.35, 6.36
Section 6.5: Exercises 6.14, 6.15
Section 6.6: Exercises 6.21-6.23

Assignment 11: due W 5/3, based on Sections 7.2 and 7.4

Exercises 7.7, 7.8, 7.11, 7.22-7.24, 7.29, 7.36