Mathematics 103 — section 203 — Spring 2000

Seventh homework — due Monday, March 20

Exercise 1. *A certain probability density is of the form $Ce^{-t/\tau}$ for a constant τ. What is C?*

Exercise 2. *What is the probability of getting between 5 and 8 heads (inclusive) in a toss of 13 balanced coins?*

Exercise 3. *Make a bar graph of the probabilities for the total score in a toss of two dice.*

Exercise 4. *What is the probability of getting between 30 and 40 heads (inclusive) in a toss of 50 balanced coins? (Use the table of areas under the bell curve.)*

Exercise 5. *The probability density of a light bulb failing at time t is $Ce^{-t/100}$ for t in days. (a) What is C? (b) What is the probability that a light bulb lasts at least 100 days? (c) What is the mean life of a light bulb? (d) The median? (e) The probability of lasting at least T days?*

Exercise 6. *The probabililty that a certain radioactive atom will disintegrate is $Ce^{-t/\tau}$ for some constant τ. (a) If the half-life of this substance is 4 days, what is τ? (b) Same assumption as in (a). What is C?*

Exercise 7. *A certain population of males has height distribution given by the bell curve*

$$\frac{1}{\sigma\sqrt{2\pi}}e^{-(x-\mu)^2/\sigma^2}$$

with $\mu = 180$ and $\sigma = 10$ (in cm). What proportion of them have height 170 or more?

Exercise 8. *Find the coordinates of the centroid of the region $0 \le x \le 1$, $y \le \sqrt{x}$.*

Exercise 9. *Estimate*

$$\int_0^1 e^{-x^2}\,dx$$

Exercise 10. *(a) If p is the exact probability of geting 50 heads from a toss of 100 coins, what is the exact probability of getting between 49 and 51 heads from a toss of 100 coins. (b) Estimate p, teling how you did so.*