Review for Final (new material only)

I have tried to include all of the formulas required, but I will not guarantee that. You will need to memorize all of the formulas required except for the ones on the equation sheet which is listed on the exam page. So that you can do the problems, you can 'buy' any formula that you have forgotten. The number of points that it will cost depends on the problem. I strongly suggest you go back through the worksheets and read through the examples in the book.

Materials Provided: Equation sheet (exam web page), z-table (Miscellaneous information web page)

Part V:

Chapter 24:

1. Determine if a random variable is discrete or continuous.

2. Be able to calculate the probability given the density and the CDF.

3. Be able to determine if a density is valid.

4. Be able to convert between the density and the CDF.

5. Be able to calculate the percentile (median) of a continuous random variable.

Chapter 25:

6. Be able to calculate the probability given the density for a joint distribution.

7. Be able to determine if a density is valid for a joint distribution.

8. Be able to convert between the density and the CDF for a joint distribution.

9. Be able to calculate the marginal distribution from joint distributions.

Chapter 26:

10. Be able to determine if two random variables are independent.

11. If two random variables are independent, be able to calculate the joint density from the marginal densities.

Chapter 27:

12. Be able to calculate the conditional density given the joint density.

13. Given the conditional density, be able to calculate a conditional probability.

Chapter 28:

14. Be able to calculate an expected value of a continuous random variable.

Chapter 29:

15. Be able to calculate expected values of functions of random variables.

16. Be able to calculate the variance and standard deviation by using the defining formula for the variance and using the computing formula for the variance.

17. Be able to use the properties of expected values and variances to calculate expected values and variances of functions of random variables.

Part VI:

18. Be able to determine if a situation is Uniform, Exponential or Normal.

19. For the following distributions:
a. Use the CDF of the distribution to calculate probabilities.
b. Use the density of the distribution to calculate probabilities. (The density for the normal distribution is on the equation sheet.)
c. Calculate the expected value and variance.

Distribution	**CDF**	**PDF**	**$\mathbb{E}$(X)**	**Var(X)**
Uniform	$\begin{cases} 0 & if\ x < a \\ \frac{x-a}{b-a} & if\ a \le x < b \\ 1 & x \ge b \end{cases}$	$\begin{cases} \frac{1}{b-a} & if\ a < x < b \\ 0 & else \end{cases}$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$
Exponential	$\begin{cases} 1-e^{-\lambda x} & if\ x \ge 0 \\ 0 & x < 0 \end{cases}$	$\begin{cases} \lambda e^{-\lambda x} & if\ x > 0 \\ 0 & x \le 0 \end{cases}$	$\frac{1}{\lambda}$	$\frac{1}{\lambda^2}$
Normal	use the table	$\frac{1}{\sqrt{2\pi}\,\sigma} e^{-(x-\mu)^2/2\sigma^2}$	μ	σ^2

20. Be able to determine the probability via relative lengths for the Uniform distribution.

21. Use the tail probability of the Exponential distribution to calculate probabilities.

22. Use lack of memory of the Exponential distribution to calculate conditional probabilities.

23. Be able to use the relationship between the Exponential random number and the Poisson random number to calculate probabilities, expected values and variances.

24. Convert a Normal distribution into a Standard Normal distribution.

25. Be able to calculate percentiles from the Normal Distribution.

26. Be able to determine if the Normal approximation to the Binomial distribution is appropriate and use this approximation to calculate probabilities.

27. Be able to perform calculations that involve a mixture of different distributions. That is, you use one distribution to generate the parameter for another distribution..