Math 105 Final Exam Formulæ

The following formulæ as well as the table of normal values (Table 1 in the appendix) will be given to you on the final exam. You do not need to memorize them; however, you should know what they mean. You may or may not need to use them on the exam.

Least Squares Line
(as stated on page 31 of the textbook)
The least squares line $Y = mx+b$ that gives the best fit to the data points $(x_1, y_1), (x_2, y_2), \ldots, (x_n, y_n)$ has slope m and y-intercept b that satisfy the equations

$$\begin{aligned} nb + (\textstyle\sum x)m &= \textstyle\sum y \\ (\textstyle\sum x)b + (\textstyle\sum x^2)m &= \textstyle\sum xy. \end{aligned}$$

Coefficient of Correlation
(as stated on page 35 of the textbook)

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2} \cdot \sqrt{n(\sum y^2) - (\sum y)^2}}$$

Bayes' Theorem
(as stated on page 366 of the textbook)

$$P(F_i|E) = \frac{P(F_i)P(E|F_i)}{P(F_1)P(E|F_1) + P(F_2)P(E|F_2) + \cdots + P(F_n)P(E|F_n)}$$

Standard Deviation
(as stated on page 455 of the textbook)
The standard deviation of the n numbers $x_1, x_2, x_3, \ldots, x_n$, with mean $\overline{x}$, is

$$s = \sqrt{\frac{\sum x_i^2 - n(\overline{x})^2}{n-1}}.$$

Mean and Standard Deviation for Binomial Distribution
(as stated on page 477 of the textbook)
For the binomial distribution, the mean and standard deviation are given by

$$\mu = np \quad \text{and} \quad \sigma = \sqrt{np(1-p)}$$

where n is the number of trials and p is the probability of success on a single trial.

Absorbing Markov Chains
If the transition matrix for an absorbing Markov chain is

$$P = \left[\begin{array}{c|c} I & 0 \\ \hline R & Q \end{array}\right]$$

then the associated fundamental matrix is $F = (I - Q)^{-1}$.