Math 189 – Formula Sheet for Final Exam

(Clean copies of the Standard Normal and t tables will also be provided.)

Integrals:

$$\int \tan x \, dx = \ln|\sec x| + C \qquad \int \cot x \, dx = -\ln|\csc x| + C$$

$$\int \sec x \, dx = \ln|\sec x + \tan x| + C \qquad \int \csc x \, dx = -\ln|\csc x + \cot x| + C$$

$$\int \sec^2 x \, dx = \tan x + C \qquad \int \csc^2 x \, dx = -\cot x + C$$

$$\int \sec x \tan x \, dx = \sec x + C \qquad \int \csc x \cot x \, dx = -\csc x + C$$

$$\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + C \qquad \int \frac{dx}{a^2 + x^2} = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + C$$

Integration by parts:

$$\int u\,dv = uv - \int v\,du$$

Differential Equations:

$$\frac{dy}{dx} + P(x)\,y = Q(x) \qquad \text{has integrating factor } e^{\int P(x)dx}$$

$$y = C_1 e^{m_1 x} + C_2 e^{m_2 x}$$

$$y = \left(C_1 x + C_2\right) e^{mx}$$

$$y = e^{\alpha x}\left(C_1 \sin \beta x + C_2 \cos \beta x\right)$$

Euler's Method:

$$y_{new} = y_{old} + f(x, y) \cdot \Delta x$$

Last modified on June 12, 2015 by Patricia Wrean.

Probability:

$$P(A|B)=\frac{P(AB)}{P(B)}$$

$$P(A \text{ or } B)=P(A)+P(B)-P(AB)$$

$$P(x=k)=C_k^n p^k q^{n-k}$$

$$P(x=k)=\frac{\mu^k e^{-\mu}}{k!} \quad \left(\text{or, if you prefer, } P(x=k)=\frac{\lambda^k e^{-\lambda}}{k!}\right)$$

$$\mu=E(x)=\sum x\,p(x)$$

$$\sigma^2=\sum(x-\mu)^2 p(x)=\sum x^2 p(x)-\mu^2$$

$$\int_{-\infty}^{\infty} f(x)dx=1$$

$$\mu=E(x)=\int_{-\infty}^{\infty} x\ f(x)dx$$

$$\sigma^2=E(x^2)-\mu^2 \quad \text{where} \quad E(x^2)=\int_{-\infty}^{\infty} x^2 f(x)dx$$

$$P(a<x<b)=\int_a^b f(x)dx$$

Statistics:

$$z=\frac{x-\mu}{\sigma}$$

$$\bar{x}-\frac{z_{\alpha/2}\sigma}{\sqrt{n}}<\mu<\bar{x}+\frac{z_{\alpha/2}\sigma}{\sqrt{n}} \qquad \bar{x}-\frac{t_{\alpha/2}s}{\sqrt{n}}<\mu<\bar{x}+\frac{t_{\alpha/2}s}{\sqrt{n}}$$

1-α	$z_{\alpha/2}$
0.90	1.645
0.95	1.960
0.98	2.326
0.99	2.576