

MATH 193: Test 2 Formula Sheet

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

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

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

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

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

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

$$\begin{aligned} \sin^2 \theta + \cos^2 \theta &= 1, & 1 + \tan^2 \theta &= \sec^2 \theta, & 1 + \cot^2 \theta &= \csc^2 \theta \\ \sin 2\theta &= 2 \sin \theta \cos \theta, & \cos 2\theta &= \cos^2 \theta - \sin^2 \theta = 2 \cos^2 \theta - 1 = 1 - 2 \sin^2 \theta \end{aligned}$$

$$x = r \cos \theta, \qquad y = r \sin \theta, \qquad dA = r \, dr \, d\theta$$

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

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

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

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

$$ma = F_g \pm kv$$

$$ma = -\beta v - kx + f(t)$$

$$EI \frac{d^4 y}{dx^4} = w \qquad \begin{array}{c|c|c} \text{clamped} & \text{hinged} & \text{free} \\ \hline y = 0 & y = 0 & y'' = 0 \\ y' = 0 & y'' = 0 & y''' = 0 \end{array}$$