M243: Calculus II (Spring 2018)
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Formula Sheet

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You may use the formulas on this sheet without deriving them. You are expected to use them correctly and justify their use when necessary. You are also expected to know any formulas that are not on this sheet. Finally, as always, you are expected to show enough work.

Trig Identities

Double Angle Formulas

$$\sin(2\theta) = 2\sin\theta\cos\theta$$
$$\begin{aligned}\cos(2\theta) &= \cos^2\theta - \sin^2\theta \\ &= 1 - 2\sin^2\theta \\ &= 2\cos^2\theta - 1\end{aligned}$$

Sum-to-Product Formulas

$$\sin(u \pm v) = \sin(u)\cos(v) \pm \cos(u)\sin(v)$$
$$\cos(u \pm v) = \cos(u)\cos(v) \mp \sin(u)\sin(v)$$

Inverse Hyperbolic Trig Functions

$$\sinh^{-1}(x) = \ln\left(x + \sqrt{x^2+1}\right)$$

$$\cosh^{-1}(x) = \ln\left(x + \sqrt{x^2-1}\right)$$

$$\tanh^{-1}(x) = \frac{1}{2}\ln\left(\frac{1+x}{1-x}\right)$$

Approximate Integration: Error bounds

$$\left|E_{M_n}\right| \le \frac{\max\limits_{a\le x\le b}\left(f''(x)\right)(b-a)^3}{24n^2}$$

$$\left|E_{T_n}\right| \le \frac{\max\limits_{a\le x\le b}\left(f''(x)\right)(b-a)^3}{12n^2}$$

$$\left|E_{S_n}\right| \le \frac{\max\limits_{a\le x\le b}\left(f^{(4)}(x)\right)(b-a)^5}{180n^4}$$

Selected Integral Formulas

$$\int \sec(u)\,du = \ln\left|\sec u + \tan u\right| + C$$

$$\int \csc(u)\,du = \ln\left|\csc u - \cot u\right| + C$$