MATH 3B EXAM 2

As stated in class, the following formulas will be provided to you for use during Exam 2:

SIMPSON'S RULE

$$\int_a^b f(x)\,dx \approx \frac{b-a}{3n}\left[f(x_0)+4f(x_1)+2f(x_2)+4f(x_3)+2f(x_4)+\cdots+2f(x_{n-2})+4f(x_{n-1})+f(x_n)\right]$$

ERROR BOUNDS (midpoint, trapezoid and Simpson's rule approximations)

$$|E_M| \le \frac{(b-a)^3 K_2}{24n^2} \qquad |E_T| \le \frac{(b-a)^3 K_2}{12n^2} \qquad |E_S| \le \frac{(b-a)^5 K_4}{180n^4}$$

TRIGONOMETRIC IDENTITIES

$$\sin\alpha\cos\beta = \frac{1}{2}\left[\sin(\alpha-\beta)+\sin(\alpha+\beta)\right]$$
$$\sin\alpha\sin\beta = \frac{1}{2}\left[\cos(\alpha-\beta)-\cos(\alpha+\beta)\right]$$
$$\cos\alpha\cos\beta = \frac{1}{2}\left[\cos(\alpha-\beta)+\cos(\alpha+\beta)\right]$$

THE METHOD OF WEIERSTRASS ("special" u-substitution)

If $u = \tan\left(\frac{x}{2}\right)$: $\sin x = \frac{2u}{1+u^2}$ $\cos x = \frac{1-u^2}{1+u^2}$ $dx = \frac{2}{1+u^2}\,du$