MAC 2312 – Calculus II — Florida Int'l Univ.

Review for Test #1 — 6.4 – 6.9 & 7.1 – 7.7

REMEMBER TO BRING AN 8"x11" BLUE EXAM BOOKLET

Main Problem Solving Techniques

1. Finding the value of various kinds of finite sums
2. Finding areas by taking the limit of Riemann Sums
3. Finding integrals by using anti-derivatives & the F.T.C.
4. Finding derivatives of integrals with variable limits
5. Finding velocity, speed, net displacement & total distance trav.
6. Finding integrals by using subst. & the change of variable Theorem
7. Finding areas by using horizontal & vertical strips.
8. Finding volumes by using thin washers & thin cylindrical shells
9. Finding the lengths of curves & areas of curved surfaces
10. Finding work done in stretching springs & lifting fluids.
11. Finding average values & verifying properties of $\ln(x)$.

Main Definitions: Riemann Sums $\sum_{i=1}^{n} f(x_i^*)\cdot\Delta x_i$, Integrable function, Integral of f over $[a,b]$, anti-derivative of f over $[a,b]$, Fundamental Theorem of Calculus, smooth curves, natural logarithm, average speed & ave. velocity.

Main Formulas: $\int_a^b f(x)\,dx = \lim_{\max \Delta x_i \to 0} \sum_{k=1}^{n} f(x_k^*)\cdot\Delta x_k$

1. $\sum_{i=1}^{n} i = n(n+1)/2$, $\sum_{i=1}^{n} i^2 = n(n+1)(2n+1)/6$, $\sum_{i=1}^{n} i^3 = [n(n+1)/2]^2$
2. $\frac{d}{dx}\left[\int_a^x f(t)\,dt\right] = f(x)$, $\int_a^b f(x)\,dx = \left[\left(\frac{d}{dx}\right)^{-1} f(x)\right]_a^b = \left[\int f(x)\,dx\right]_a^b$
3. $A = \int_a^b [y_2(x) - y_1(x)]\,dx$ $\qquad L = \int_a^b \sqrt{1 + (dy/dx)^2}\,dx$
4. $V_1 = \int_a^b (\pi y_2^2 - \pi y_1^2)\cdot dx$ $\qquad V_2 = \int_a^b 2\pi x\cdot(y_2 - y_1)\cdot dx$
5. $S_x = \int_a^b 2\pi\cdot y\cdot\sqrt{1+(dy/dx)^2}\,dx$ $\qquad S_y = \int_a^b 2\pi x\cdot\sqrt{1+(dy/dx)^2}\,dx$
6. Net Displ. $= \int_{t_1}^{t_2} v(t)\,dt$, Total Dist. travelled $= \int_{t_1}^{t_2} |v(t)|\,dt$
7. $W_S = \int_a^b F(x)\cdot dx$, $W_L = \int_a^b (\text{dist.})\,\rho g\,dV.$, Ave. $= \frac{1}{b-a}\int_a^b f(x)\,dx$