SI Session Week 10
Thursdays 4:00 – 5:30 PM, Rm. 1229
Fridays 2:00 – 3:30 PM. Rm. 1223

Prof. Stockton : Calculus I : Fall 2007
SI Leader : Neil Jody

Directions: Evaluate and/or calculate as indicated.

Tips: $\int cf(x)\,dx = c\int f(x)\,dx$,

$\int\left[f(x)\pm g(x)\right]dx = \int f(x)\,dx \pm \int g(x)\,dx$

$\int x^n dx = \frac{x^{n+1}}{n+1} + C$, if $n \neq -1$

"What function's derivative is the integrand?"

1. A wire 36 cm long is cot into two pieces. One of the pieces will be bent into the shape of an equilateral triangle and the other into the shape of a rectangle whose length is twice its width. Where should the wire be cut if the combined area of the triangle and rectangle is (a) minimized? (b) maximized?

2. A window has the shape of a rectangle surmounted by a semicircle. If the perimeter of the window is 15 ft, find the dimensions that will allow the maximum amount of light to enter.

Use the given information to evaluate and compare dy and Δy.

3. $y = \sqrt{3x-2}$; from $x = 2$ to $x = 2.03$

4. $y = \sqrt{x^2+8}$; from $x = 1$ to $x = 0.97$

5. $y = \frac{x}{x^2+1}$; from $x = 2$ to $x = 2.96$

6. $y = x\sqrt{8x+1}$; from $x = 3$ to $x = 3.05$

Use the limit process to find the area of the region between the graph of the function and the x-axis over the given interval.

7. $f(x) = 2x - 2x^2$, $x \in [0,1]$

8. $f(x) = x^3 - 1$, $x \in [0,2]$

9. $\int\left[3\sin x - 2\sec^2 x\right]dx$

10. $\int\left[\csc^2 t - \sec t\tan t\right]dt$

11. $\int \sec x\left(\sec x + \tan x\right)dx$

12. $\int \csc x\left(\sin x + \cot x\right)dx$

13. $\int \frac{\sec\theta}{\cos\theta}\,d\theta$

14. $\int \frac{dy}{\csc y}$

15. $\int \frac{\sin x}{\cos^2 x}\,dx$

16. $\int\left[\phi + \frac{2}{\sin^2\phi}\right]d\phi$

17. $\int\left[1 + \sin^2\theta\csc\theta\right]d\theta$

18. $\int \frac{\sec x + \cos x}{2\cos x}\,dx$

1.) $\Delta x = \frac{b-a}{n}$

2.) the right endpoint of the k^{th} interval is $a + k\Delta x$.

3.) $S_n = \sum_{k=1}^{n} f\left(a + k\Delta x\right)\Delta x$

4.) $\text{Area} = \lim_{n\to\infty} S_n$

(a) $\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$

(b) $\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$

(c) $\sum_{k=1}^{n} k^3 = \frac{n^2(n+1)^2}{4}$