SI Session: Exam III Review
Tuesdays: 3:30 PM – 5:00 PM
Thursdays: 1:30 PM – 3:00 PM
& 3:30 PM – 5:00 PM
Room 1245 SNAD

Prof. Stockton : Calculus I
Spring 2009
SI Leader : Neil Jody

[1] Find the exact area of the region below the graph of $y=(x+1)^2$, above the *x*-axis, and between the lines $x=-1$ and $x=2$ by taking the limit of a Riemann sum.

[2] Find the function f that satisfies the following conditions:

(i) $f''(x)=\sin x+6x$

(ii) $f'(0)=4$

(iii) $f(0)=3$

[3] Express $\lim_{\|P\|\to 0}\sum_{k=1}^{n}(c_k+3\sin c_k)\Delta x_k$ as a definite integral over the interval $[-\pi,\pi]$.

Do not evaluate the integral.

[4] Calculate $\frac{dy}{dx}$ if $y=\int_{2x}^{x^2}\frac{1}{t^2+9}\,dt$.

[5] Find the average value of the function $f(x)=3x^2+2x+1$ on the interval $[1,3]$.

[6] Write down an integral representing the area under the curve of $y=\sqrt{x}+2x$, above the *x*-axis, and between the lines $x=1$ and $x=4$. Then evaluate the integral.

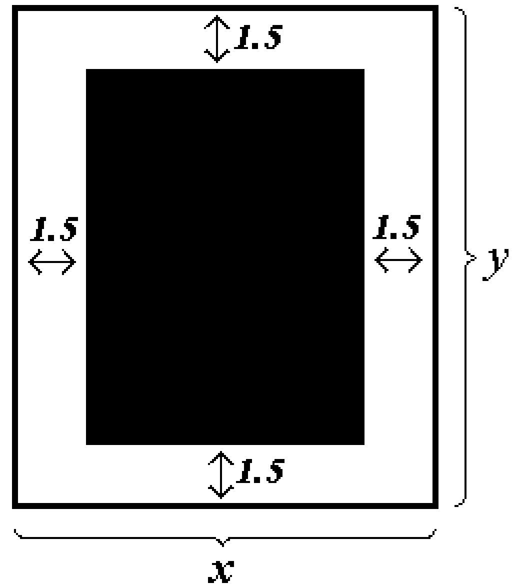
[7] Let $y=x^4+2x$. If $x=-1$ and $dx=0.03$, calculate each of the following:

(a) dy

(b) Δy

[8] Suppose that $f(4)=-2$ and $f'(4)=5$. Use differentials to approximate $f(3.95)$.

[9] A rectangular page is to contain 36 square inches of print. The margins on each side are to be 1.5 inches. Find the dimensions of the page such that the least amount of paper is used (see figure).



[10] Evaluate each of the following integrals.

(a) $\int \frac{x^4 + 3x - 2}{x^3}\, dx$

(b) $\int_0^{\frac{2\pi}{3}} (\sin x + 2\cos x)\, dx$

(c) $\int_0^1 \frac{x}{\sqrt{3x^2+1}}\, dx$

(d) $\int \sin x (\cos x + 3)^7\, dx$

(e) $\int \sec 3x \tan 3x\, dx$

(f) $\int_{1/2}^{1} \frac{\left(1 + \frac{1}{x}\right)^{-2}}{x^2}\, dx$

(g) $\int \frac{\sqrt{9 - \sqrt{x}}}{\sqrt{x}}\, dx$