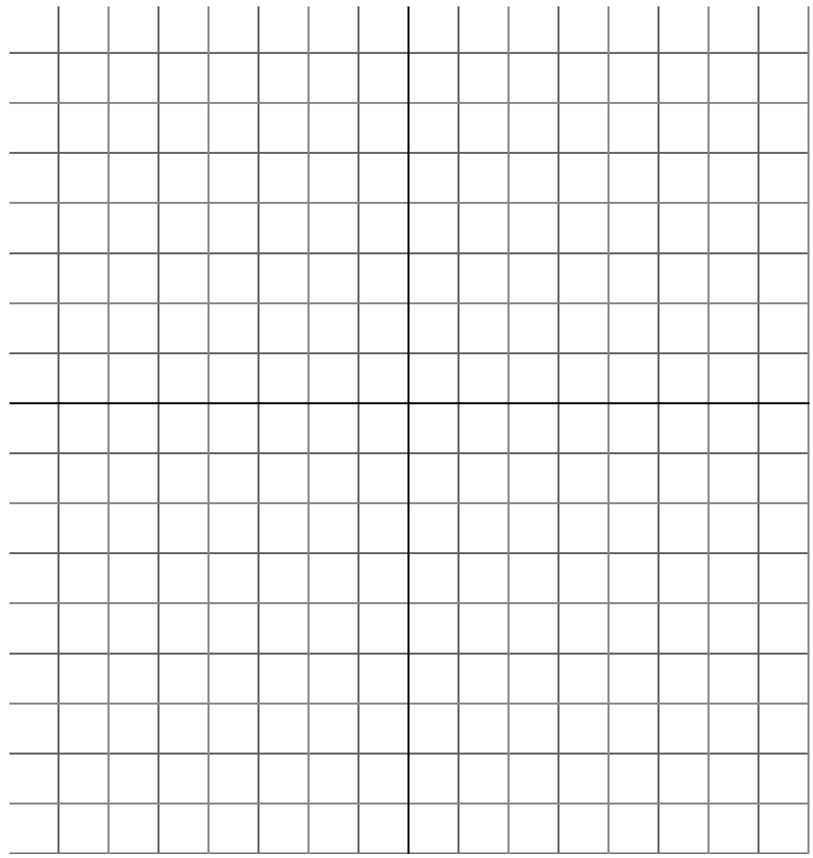
SI Session Final Exam Review
May 2nd 2:00 PM – 4:00 PM Rm. 1229
May 3rd 12:00 – 2:00 PM, Rm. 1229
May 5th 4:20 – 6:20 PM. Rm. 1229

Prof. Stockton : Calculus II : Spring 2008
SI Leader : Neil Jody

[1] Let C be the portion of the graph of $y = \cos x + 2$ corresponding to $\frac{\pi}{2} \le x \le \pi$. Write down an integral representing each of the following:

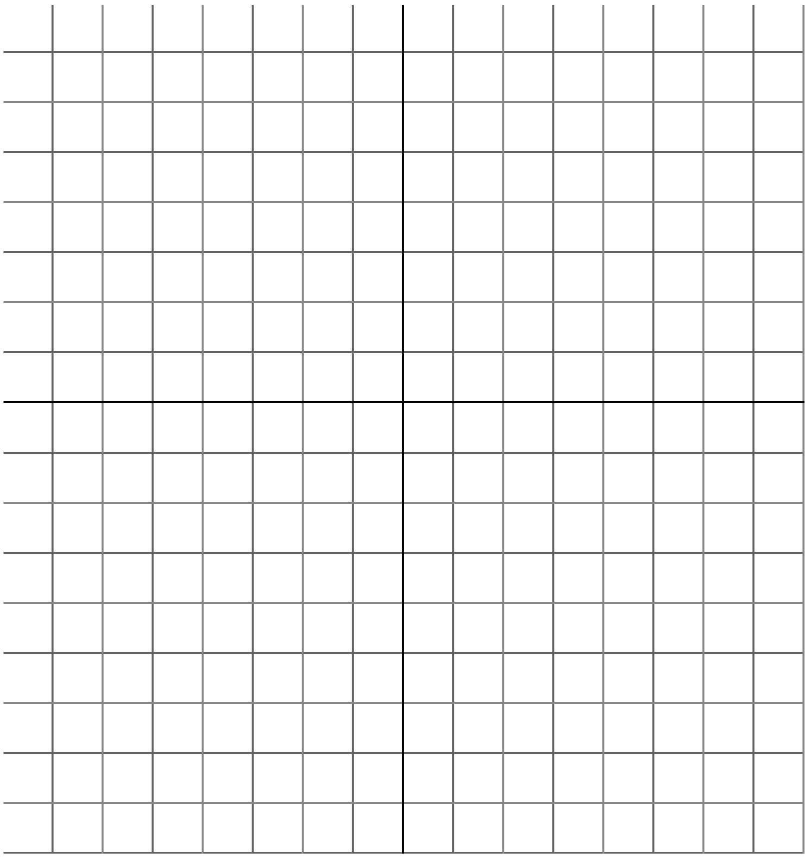
(a) the area of the surface obtained by revolving C about the x-axis
(b) the area of the surface obtained by revolving C about the y-axis
(c) the area of the surface obtained by revolving C about the line $x = 4$
(d) the area of the surface obtained by revolving C about the line $y = 3$
(e) the area of the surface obtained by revolving C about the line $x = -2$
(f) the area of the surface obtained by revolving C about the line $y = -1$



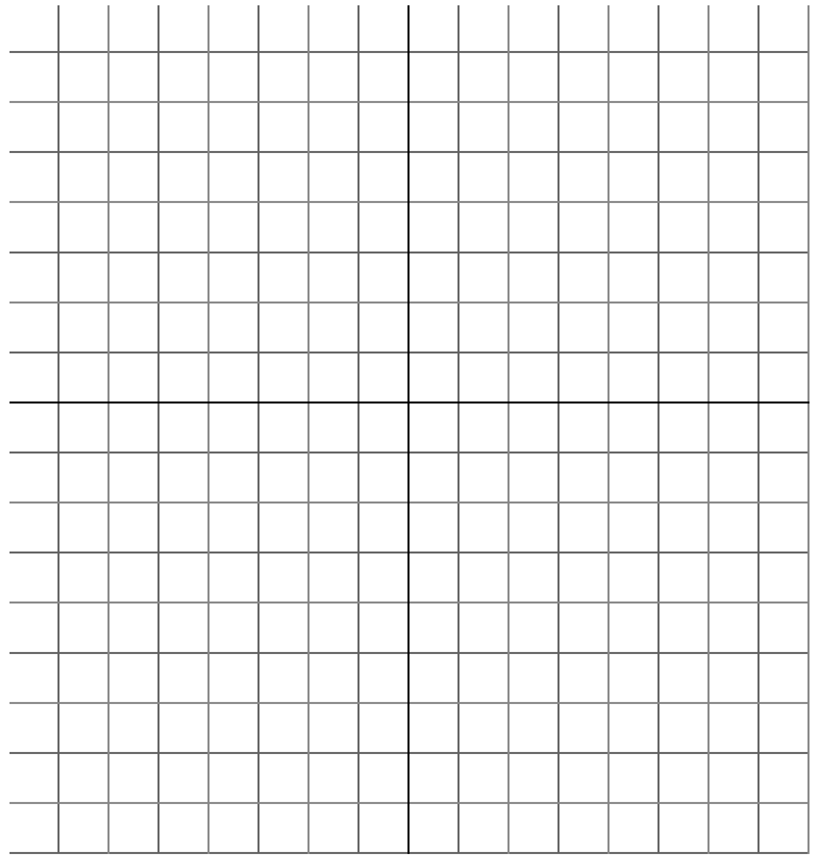
[2] Let R denote the region in the xy-plane bounded by the graphs of $y = \ln x$, $y = 1$, and $y = 1 - x$. For each of the following, write down an integral representing the volume of the solid obtained by revolving R about the indicated line:

(a) the x-axis (b) the y-axis (c) the line $x = -2$

(d) the line $y = 2$ (e) the line $x = 4$ (f) the line $y = -1$



[3]Write a definite integral that represents the Area between the given curves.



$y = e^x$, $y = e^{2x}$, $x = 0$, $x = \ln 2$

[4] Differentiate the following.

(a) $\dfrac{d}{dx}\left[y = \dfrac{1}{\tan^{-1} x} \right]$

(b) $\sec\left[\sin^{-1}(x-1) \right]$

[5] $\int \frac{1}{x\sqrt{1-(\ln x)^2}}\,dx$

[6] Evaluate the limit.

$$\lim_{x\to\infty}\left(5+2e^{2x}\right)^{e^{-2x}}$$

[7] Evaluate each integral.

(a) $\int \cos^4 x\,dx$

(b) $\int e^x \cos x \, dx$

(c) $\int \frac{x}{x^2 - 6x + 5} dx$

(d) $\int \frac{\sqrt{1-4x^2}}{x} dx$

[8] Determine if each of the following improper integrals converges or diverges. If it converges, state its value.

(a) $\int_3^4 \frac{1}{(x-3)^{4/3}}\,dx$

(b) $\int_0^\infty \frac{1}{4+x^2}\,dx$

[9] Determine if each series is *absolutely* convergent, *conditionally* convergent, or divergent. Indicate the convergence tests used

(a) $\displaystyle\sum_{n=1}^{\infty}(-1)^n \frac{(n!)^2}{(3n)!}$

(b) $\displaystyle\sum_{n=1}^{\infty}\frac{\ln n}{n^2}$

[10] Find a power series, centered at 0, for the following functions. Identify the interval of convergence.

(a) $g(x)=\dfrac{4x-7}{2x^2+3x-2}$

(b) $f(x)=\arctan 2x$

[11] Find the *n*th Taylor polynomial centered at *c*.

(a) $f(x) = \sqrt{x}, n = 4, c = 1$

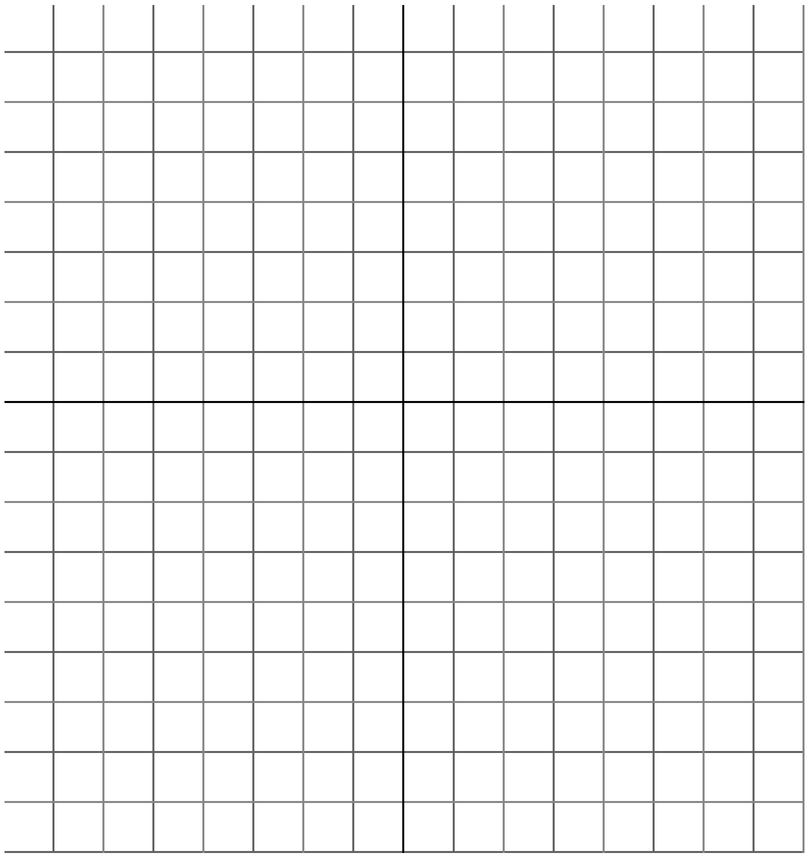
(b) $f(x) = x^2 \cos x, n = 2, c = \pi$

[12] Find the Maclaurin series for the function.

(a) $f(x) = \cos x^{3/2}$

[13] Sketch the curve represented by the parametric equations(indicate the orientation of the curve), and write the corresponding rectangular equation by eliminating the parameter.

$x = \sec\theta,\ y = \cos\theta,\ 0 \le \theta < \frac{\pi}{2}, \frac{\pi}{2} < \theta \le \pi$



[14] Find two different sets of parametric equations for the rectangular equation.

$$y = \frac{2}{x-1}$$

[15] Convert the rectangular equation to polar form.

(a) $y = 4$

(b) $y^2 = 9x$

[16] Convert the polar equation to rectangular form.

(a) $r = 3$

(b) $r = 2\csc\theta$