

## Solutions to the December 2008 Calculus 2 (NYB) Exam

1. 2
2. (a)  $-\frac{1}{2}e^{-x^2} + \pi x + C$   
(b)  $(\ln x)[\ln(\ln x) - 1] + C$   
(c)  $-\sqrt{9-x^2}\left(\frac{18+x^2}{3}\right) + C$   
(d)  $\frac{\pi-2}{4}$   
(e)  $\ln|x-1| + \frac{1}{2}\ln(x^2+2) - \sqrt{2}\arctan\left(\frac{x}{\sqrt{2}}\right) + C$   
(f)  $\frac{\tan^3(\sin x)}{3} + \frac{\tan^5(\sin x)}{5} + C$
3. (a)  $e^{10}$   
(b) Divergent
4. (a) 0  
(b)  $\frac{11}{5}$
5.  $\frac{1}{12}$
6. (a)  $\pi \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \left(\frac{1}{x^4} - \frac{\cos^2 x}{x^2}\right) dx$   
(b)  $\pi[2(\ln 2 - 1) + \sqrt{2}]$
7.  $y = \frac{1}{\ln|x+1|+2}$
8. (a) Diverges  
(b) 0  
(c)  $\frac{1}{e}$
9. (a)  $\frac{12}{5}$   
(b)  $-\frac{1}{\ln 2}$
10. (a) Converges (Ratio Test)  
(b) Converges (Direct Comparison Test)  
(c) Converges (Direct Comparison Test—also can use Limit Comparison Test with  $\frac{1}{n^2}$  or Integral Test)  
(d) Diverges (Limit Comparison Test—also can use Direct Comparison Test with  $\frac{1}{\sqrt{n}}$ )
11. (a) Absolutely Convergent  
(b) Conditionally Convergent
12.  $R = 1$  and I.C. =  $(2, 4]$
13.  $\sum_{n=0}^{\infty} \frac{(-1)^{n+1}(x-5)^n}{3^{n+1}}$ , with I.C. =  $(2, 8)$