

## Final Exam Practice Answers:

1) a.  $\frac{x^2 \ln(x)}{2} - \frac{x^2}{4} + c$  b.  $(x+1)^2 e^{x+1} - 2(x+1)e^{x+1} + 2e^{x+1} + c$  c.  $\frac{(2x+3)}{2} \arctan(2x+3) - \frac{\ln(1+(2x+3)^2)}{4} + c$

2) a.  $\frac{1}{1 - \frac{2012}{2013}} = 2013$  geometric  
b. diverges by divergence theorem  
c.  $\frac{4^5}{6^7} \left( \frac{1}{1 - 4/6} \right) = \frac{32}{729}$  geometric  
d. 1 (telescoping)

3) a. diverges by integral test  
b. diverges by divergence theorem  
c. converges alternating series test

d. converges root test,  $(1 - \frac{1}{2n})^n \rightarrow e^{-1/2}$   
e. converges comparison test compare to  $\frac{1}{n^2}$   
f. diverges comparison test

4) radius = 4  
interval  $(-2, 6]$

5)  $\sum_{n=1}^{\infty} nx^n$  (take derivative of geometric, multiply by x)