

**Math 675**  
Assignment #7

Name \_\_\_\_\_

51. Suppose that  $f(x) \sim \sum_{k=0}^{\infty} a_k x^{-k}$  as  $x \rightarrow \infty$ . Prove that  $f(x) - \sum_{k=0}^N a_k x^{-k} = O(x^{-N-1})$ .

52. Find the full asymptotic expansion as  $x \rightarrow \infty$  of  $\int_0^2 \frac{e^{-xt}}{1+t^2} dt$ .

53. Find the leading behavior of  $\int_0^{\pi/2} e^{-x \tan^2 \theta} d\theta$  as  $x \rightarrow \infty$ .

54. Find the leading behavior of  $\int_0^{\pi/2} t e^{-x \cos t} dt$  as  $x \rightarrow \infty$ .

55. Find the leading behavior of  $\int_0^{2\pi} (1+t^2) e^{x \cos t} dt$  as  $x \rightarrow \infty$ .