MATH 313 — HOMEWORK # 9 Due : Friday, April 8, 2016.

Reading : Schaum's examples 6.22,6.23,6.24,6.25,6.27

1. Consider $f(z) = \dfrac{1}{z^2(1-z)}$. Find a Laurent series expansion in the regions
   (a) $0 < |z| < 1$
   (b) $1 < |z| < \infty$

2. Write the two Laurent series in powers of z that represent the function

$$f(z) = \frac{1}{z(1+z^2)}$$

   in certain domains, and specify those domains.

3. Show that

$$\frac{e^z}{z(z^2+1)} = \frac{1}{z} + 1 - \frac{1}{2}z - \frac{5}{6}z^2 + \dots$$

   for $0 < |z| < 1$.