# Solutions to Homework Assignment 33

**MATH 345**

**Section 73, Page 224**

**1,3**

1. For $\dfrac{e^z}{z(z^2+1)}$, we have

$$\begin{aligned}
\frac{1}{z}\left(\sum_{n=0}^{\infty}\frac{z^n}{n!}\right)\left(\sum_{m=0}^{\infty}(-z^2)^m\right) &= \frac{1}{z}\left(\sum_{n=0}^{\infty}\frac{z^n}{n!}\right)\left(\sum_{m=0}^{\infty}(-1)^m z^{2m}\right) \\
&= \frac{1}{z}\left(1+z+\frac{z^2}{2}+\frac{z^3}{6}+\dots\right)\left(1-z^2+z^4-\dots\right) \\
&= \frac{1}{z}\left(1+z+\left(\frac{z^2}{2}-z^2\right)+\left(\frac{z^3}{6}-z^3\right)+\dots\right) \\
&= \frac{1}{z}+1-\frac{z}{2}-\frac{5z^2}{6}+\dots
\end{aligned}$$

3. Ugh. Not gonna try to LaTeX this one...