Solutions to Homework Assignment 18

MATH 345-01

Section 38, Page 107

4,8,12

4. (a) $\sin^2 z + \cos^2 z = \sin z \sin z + \cos z \cos z = \cos z \cos(-z) - \sin z \sin(-z) = \cos(z - z) = \cos 0 = 1$.
   (b) On the x-axis, $\cos^2 x + \sin^2 x - 1 = 0$. Thus $\cos^2 z + \sin^2 z - 1 = 0$ in all of $\mathbb{C}$.
8. Since $\sinh^2 y \geq 0$, these are certainly true.
12. We have $\sin x \in \mathbb{R}$ when $x \in \mathbb{R}$, so $\sin \overline{z} = \overline{\sin z}$ by the reflection principle. The same argument applies to $\cos z$.