Problem Set 5

All of the following refer to angular momentum in three dimensions.

1. Show that $[p_y,\ L_x] = -ip_z$.
2. Show that $[y,\ L_x] = -iz$.
3. Show that $[p^2,\ L^2] = 0$.
4. Show that $[r^2,\ L^2] = 0$.
5. Show that $L^2 = r^2p^2 - (\mathbf{r}\cdot\mathbf{p})^2 + i\mathbf{r}\cdot\mathbf{p}$.