5.5c $\sqrt{\mu - \Delta V/2\rho} + \frac{1}{\mu} = \pm \frac{i}{2\hat{\sigma}_x}$

$$\mu\sqrt{\mu - \Delta V/2\rho} + 1 = \frac{i\mu}{2\hat{\sigma}_x}$$

$$R = \frac{\hat{r}}{\hat{\sigma}_x}$$

$$\omega = \frac{-\mu\sqrt{\mu - \Delta V/2\rho}}{4\left(\mu\sqrt{\mu - \Delta V/2\rho} + 1\right)}$$

$$= \frac{\frac{-i\mu}{2\hat{\sigma}_x} + 1}{\frac{2i\mu}{\hat{\sigma}_x}} \Rightarrow \frac{-i\cancel{\mu}}{2\cancel{\hat{\sigma}_x}} \frac{\cancel{\hat{\sigma}_x}}{2i\cancel{\mu}} + \frac{\hat{\sigma}_x}{2i\mu}$$

$$\omega = -\frac{1}{4} + \frac{\hat{\sigma}_x}{2i\mu} = -\frac{1}{4} + \frac{i\hat{\sigma}_x}{2\mu}$$

$$A_\infty = \exp(\omega R^2)$$

$$= \exp\left(\left[\frac{-i\hat{\sigma}_x}{2\mu} + \frac{1}{4}\right]\left(\frac{\hat{r}}{\hat{\sigma}_x}\right)^2\right)$$

$$= \exp\left(\frac{-i\hat{r}^2}{2\mu\hat{\sigma}_x} + \frac{\hat{r}^2}{4\hat{\sigma}_x^2}\right)$$