Show that each improper integral converges. Then find a definite integral that approximates the improper integral within 10^{-10} of its actual value.

1. $\displaystyle\int_2^\infty \frac{2}{\sqrt{x}+x^2}\,dx$

2. $\displaystyle\int_1^\infty \frac{1}{e^x+2}\,dx$