1. Q) Convergent/Divergent? $\int_2^\infty \frac{1}{x^2+x}dx$

A) Let

$$\begin{aligned} I &= \int \frac{1}{x^2+x}dx \\ &= \int \frac{1}{x}dx - \int \frac{1}{1+x}dx \\ &= \ln|x| - \ln|1+x| + C \end{aligned}$$

Therefore $[I]_2^\infty = [\ln|x| - \ln|1+x|]_2^\infty$

$= [\ln|\infty| - \ln|\infty| - \ln|2| + \ln|3|] = \ln(3/2)$