Solve the following mathematical problems.

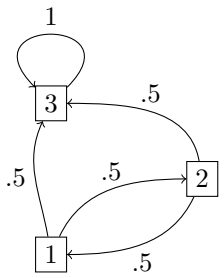
Obtain:

$$\int e^x \cos(x)$$

Obtain:

$$\lim_{x \to 1} \frac{x^4 - 1}{x^2 - 1}$$

What is the long run stationary distribution of the following discrete time Markov chain:



Minimize: $4x + 12y$
subject to:

$$\begin{aligned} x &\geq 0 \\ y &\geq 0 \\ 5x - y &\geq 2 \\ x + 2y &\leq 1 \end{aligned}$$

Obtain the mixed Nash equilibria for the following game:

$$\begin{pmatrix} 5,6 & 1,0 \\ 0,1 & 6,5 \end{pmatrix}$$