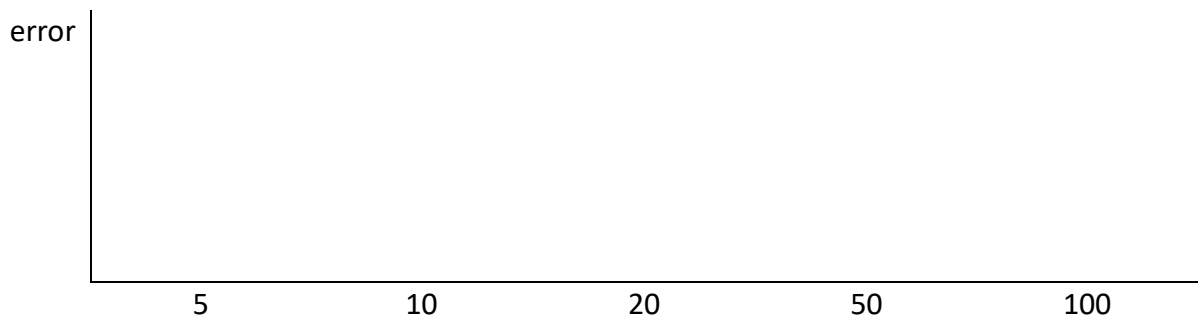


Exam Simulation

1. Estimate $\sin(\pi/3)$ using Maclaurin series for $n = 10$ then calculate the error between exact value and the estimation.

$$\sin x = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!} x^{2n+1} = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \dots \quad \text{for all } x$$

2. Plot the absolute error of the $\sin(\pi/3)$ estimation for different values of n e.g. $n = 5, 10, 20, 50, 100$ where absolute error = $|\text{exact_value} - \text{estimated_value}|$



3. Use sympy to calculate

$$\int_0^{\pi/2} \frac{\sin x}{1+x^2} dx$$

4. Estimate the integration of the problem number 3 using Simpson's 1/3 rule for different number of intervals then calculate the error in % where $\text{error}(\%) = 100 * |\text{exact_value} - \text{estimated_value}| / \text{exact_value}$. Print the output as follow:

n	estimation	error(%)
2		
5		
10		
100		