

8. [11 points]

a. [6 points] Give the first three non-zero terms of the Taylor Series for the function:

$$(x^2 + 2) \sin(x)$$

centered at $x = 0$.

b. [5 points] Compute the limit:

$$\lim_{x \rightarrow 0} \frac{\int_0^{2x} \left(\left(\frac{t}{2} \right)^2 + 2 \right) \sin \left(\frac{t}{2} \right) dt}{x^2}$$

Answer: _____