

Calculus Quiz1(9/30)

1.

Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of the function.

$$R(y) = \int_y^2 t^3 \sin t \, dt$$

[Solution]

$$R(y) = \int_y^2 t^3 \sin t \, dt = - \int_2^y t^3 \sin t \, dt \Rightarrow R'(y) = - \frac{d}{dy} \int_2^y t^3 \sin t \, dt = -y^3 \sin y$$

2.

Express the limit as a definite integral on the given interval.

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{1 - x_i^2}{4 + x_i^2} \Delta x, \quad [2, 6]$$

[Solution]

$$\text{On } [2, 6], \quad \lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{1 - x_i^2}{4 + x_i^2} \Delta x = \int_2^6 \frac{1 - x^2}{4 + x^2} \, dx.$$