

IMG_20191026_221655_5.jpg

IMG_20191026_221636_9.jpg

$$2. \quad y = 2 \sin \frac{\pi}{10} \text{ and } x = 2 + 2t - 2 \cos \frac{\pi}{10} \quad t=0$$

and $t=10$

find the area bounded by the curve

$$\text{Sol}$$

$$A = \int_a^b y \, dx$$

$$A = \int_0^{10} 2 \sin \frac{\pi}{10} \, dx$$

$$x = 2 + 2t - 2 \cos \frac{\pi}{10} \quad t$$

$$\frac{dx}{dt} = 2 + \frac{\pi}{5} \sin \frac{\pi}{10} t$$

$$A = \int_0^{10} 2 \sin \frac{\pi}{10} + \left[2 + \frac{\pi}{5} \sin \frac{\pi}{10} t \right] dt$$

$$A = \int_0^{10} 4 \sin \frac{\pi}{10} + \frac{\pi t}{5} \sin \frac{\pi}{10} + dt$$

$$A = 2 \int_0^{10} 2 \sin \frac{\pi}{10} + \frac{\pi}{5} \sin \frac{\pi}{10} + dt$$

$$A = 2 \left[-\frac{20}{\pi} \cos \left(\frac{\pi}{10} t \right) - 2 \cos \frac{\pi}{10} + \right]_0^{10}$$

$$A = \left[-\frac{40}{\pi} \cos \left(\frac{\pi}{10} \right) - 4 \cos \frac{\pi}{10} + \right]_0^{10}$$

$$A = \left[\left(-\frac{40}{\pi} \cos \left(\frac{\pi}{10} \times 10 \right) - 4 \cos \frac{\pi}{10} \times 10 \right) - \left(-\frac{40}{\pi} \cos \left(\frac{\pi}{10} \times 0 \right) - 4 \cos \frac{\pi}{10} \times 0 \right) \right]$$

$$A = -8.73 - 8.73$$

$$A = \underline{\underline{-17.46 \text{ units}^2}}$$

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Assignment 3

- 1) $y = 3e^{2x}$ and $y = 3e^{-x}$ at the points $x=1$ and $x=2$ find the area bounded by the curves

Sol

Area btw two curves

$$A = \int_a^b f(x) - g(x) dx$$

where $f(x) = 3e^{2x}$ and $g(x) = 3e^{-x}$

$$a = 1, b = 2$$

$$A = \int_1^2 3e^{2x} - (3e^{-x}) dx$$

$$A = \int_1^2 3e^{2x} - 3e^{-x}$$

$$A = 3 \int_1^2 e^{2x} - e^{-x}$$

$$A = 3 \left[\frac{e^{2x}}{2} + e^{-x} \right]_1^2$$

$$A = 3 \left[\frac{e^{2(2)}}{2} + e^{-2} \right] - \left[\frac{e^{2(1)}}{2} + e^{-1} \right]$$

$$A = 3 [27.2 + 0.135] - 4.06$$

$$A = 3(23.275)$$

$$A = 69.823 \text{ units}^2 \approx \underline{70 \text{ units}^2}$$