1) $y = 3e^{2x}$, $y = 3e^{-x}$ at Coordinates $x = 1, 2$

Area bounded by the Curve (A) $= \int_1^2 3e^{2x}dx - \int_1^2 3e^{-x}dx$

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

$A = \left[\frac{3}{2}(e^4 - e^2) + c - c\right] - \left[-3e^{-2} + 3e^{-1} + c - c\right]$

$A = [70.81] - [0.698]$

$A = 70.112$ units^2

2) $y = 2\sin\left(\frac{\pi t}{10}\right)$, $x = 2 + 2t - 2\cos\left(\frac{\pi t}{10}\right)$

$dx/dt = 2 - 2\cdot\left(-\sin\frac{\pi t}{10}\right) \times \frac{\pi}{10}$

$dx/dt = 2 + 2 \times \frac{\pi}{10}\sin\left(\frac{\pi t}{10}\right)$

$dx/dt = \frac{2\pi}{5}\sin\left(\frac{\pi t}{10}\right)dt$

Area bounded by the Parametric Equations (A) $= \int_{x_1}^{x_2} y\,dx$

$A = \int_{x_1}^{x_2} 2\sin\left(\frac{\pi t}{10}\right)dx$

but $dx = \frac{2\pi}{5}\sin\left(\frac{\pi T}{10}\right)dt$

$A = \int_{t_1}^{t_2} 2\sin\left(\frac{\pi t}{10}\right)\left[2 + \frac{2\pi}{5}\sin\left(\frac{\pi T}{10}\right)\right]dt$

$t_2 = 10$, $t_1 = 0$

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

$A = \int_0^{10} 4\sin\left(\frac{\pi t}{10}\right) + \frac{\pi}{5}\sin^2\left(\frac{\pi t}{10}\right)dt$

$A = \int_0^{10} 4\sin\left(\frac{\pi t}{10}\right)dt + \int_0^{10}\frac{\pi}{5}\sin^2\left(\frac{\pi t}{10}\right)dt$

$A = \int_0^{10}\sin\left(\frac{\pi t}{10}\right)dt + \frac{4\pi}{5}\int_0^{10}\sin^2\left(\frac{\pi T}{10}\right)dt$

$\cos^2 x - \sin^2 x = \cos 2x$

$1 - \sin^2 x - \sin^2 x = \cos 2x$

$1 - 2\sin^2 x = \cos 2x$

$\Rightarrow \sin^2 x = \frac{1 - \cos 2x}{2}$

$\int \sin^2 x\,dx = \int \frac{-\cos 2x}{2}dx = \frac{1}{2}\int 1 - \cos 2x\,dx$

$= \frac{1}{2}\left[x - \frac{1}{2}\sin 2x + c\right]$

$\therefore A = \left[\frac{4 \times 10}{\pi}\cos\left(\frac{\pi t}{10}\right) + C\right]_0^{10} + \left[\frac{\pi}{5} \times \frac{10}{\pi} \times \frac{1}{2}\frac{\pi t}{10} - \frac{1}{2}\sin\left(2 \times \frac{\pi t}{10}\right) + c\right]$

$A = \left[\frac{40}{\pi}\cos\left(\frac{\pi t}{10}\right) + C\right]_0^{10} + \left[\frac{\pi T}{10} - \frac{1}{2}\sin\left(\frac{\pi T}{5}\right) + C\right]_0^{10}$

$A = \left[\frac{40}{\pi}\cos\left(\frac{\pi \times 10}{10}\right) - \frac{40}{\pi}\cos\left(\frac{\pi \times 0}{10}\right)\right] + \left[2\left(\frac{\pi \times 10}{10} - \frac{1}{2}\sin\left(\frac{\pi \times 10}{5}\right)\right] - 2\right.$
$\left[\frac{\pi \times 10}{10} - \frac{1}{2}\sin\left(\frac{\pi \times 0}{5}\right)\right]$

$$A = \left[-\frac{40}{\pi} - \frac{40}{\pi} \right] + \left[2\pi - \frac{2\sin 2x}{2} - 2\left(0 - \frac{1}{2}\sin 0\right) \right]$$

$$A = \left[\frac{-80}{\pi} \right] + \left[2\pi - 0 - 0 \right]$$

$$A = -\left(-\frac{80}{\pi}\right) 2\pi$$

$$A = \frac{2\pi^2 - 80}{\pi} \text{ units}^2$$