$$= \left[\frac{40}{\pi} + 2\pi\right] - \left[-\frac{40}{\pi}\right]$$

$$\therefore \frac{40}{\pi} + 2\pi + \frac{40}{\pi}$$

$$= \frac{80}{\pi} + \frac{2\pi}{\pi} = \frac{80 + 2\pi}{\pi} = 31.74 \text{ square units}$$ //

Math h/w

1) $x = 1, x = 2$

$y = 3e^{-x}$ $y = 3e^{2x}$ let $a = 3e^{2x}$

$b = 3e^{-x}$

$$A = \int_a^b y_{\text{of } A}\, dx - \int_a^b y_b\, dx$$

$$\int_1^2 3e^{2x} = \left[\frac{3e^{2x}}{2}\right]_1^2 = \frac{3e^4}{2} - \frac{3e^2}{2} = 70.8 \text{ square units}$$

$$\int_1^2 3e^{-x} = \left[\frac{3e^{-x}}{-1}\right]_1^2 = -3e^{-2} - (-3e^{-1}) = 0.698 \text{ square units}$$

$\therefore$ the total area bound by the curves

$70.8 - 0.68 = 70.11$ square units.

11) $y = 2\sin \frac{\pi}{10} t$ $x = 2 + 2t - 2\cos \frac{\pi}{10} t$

$A = \int_a^b y\, dx$ $a = 0, b = 10$

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

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

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

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

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

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

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