$$\int_0^{10} \cancel{\;10\cos\;}$$

$$= \int_0^{10} \left[ \frac{-40\cos(\pi t/10)}{\pi} + \left( \frac{2\pi}{5} \times \pi t - 5\sin\left(\frac{\pi t}{5}\right)\right)\right]$$

$$= \int_0^{10} \left[ \frac{-40\cos(\pi t/10)}{\pi} + \frac{\pi t - 5\sin(2t/5)}{5} \right]$$

$$= \left[ \frac{-40\cos(\pi(10)}{10} + \frac{\pi(10) - 5\sin(\pi 100/5)}{5} \right] - \left[ \frac{-40\cos(\pi\cos/10)}{\pi} + \frac{\pi(0) - 5\sin(\pi\cos/5)}{5} \right] = \left[ \frac{40}{\pi} + 2\pi \right] - \left[ \frac{-40}{\pi} + 0 \right]$$

$$= \frac{40}{\pi} + 2\pi + \frac{40}{\pi} = \frac{80}{\pi} + 2\pi$$

$= 31.74$ square units

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1. $y_a = 3e^{2x}$
$y_b = 3e^{-x}$
$, x=1, x=2$

Area $= \int_a^b y_a\,dx - \int_a^b y_b\,dx$

$y_a = 3e^{2x}$

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

$= \cancel{70.813}$

$= 70.81$ square units

$y_b = 3e^{-x}$

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

$= 0.698$ square units

$\therefore$ Area bounded by the curves

$= 70.81 - 0.698 = 70.116$ square units

2. $y = 2\sin \pi/10t$

$x = 2 + 2t - 2\cos \pi/10t$

Area $= \int_b^a y\,dx \quad b=10, a=0$

$dx = 2 + \pi/5 \sin \pi/10t\,dt$

$\therefore A = \int_0^{10} 2\sin \pi/10 + [2 + \pi/5 \sin \pi/10t]$

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

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