

ENG 281 ASSIGNMENT

OKPALE AHIONAWA GIFT-DHEJI

18/MHSOI/272

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BIOMEDICAL ENGINEERING

1. Banded area = $\int_{-1}^2 (3e^{2x}) dx - \int_{-1}^2 (3e^{-x}) dx$

$$= \int_{-1}^2 [(3e^{2x}) - (3e^{-x})] dx$$
$$= \int_{-1}^2 (3e^{2x} - 3e^{-x}) dx$$
$$= \left[\frac{3e^{2x}}{2} - \frac{3e^{-x}}{-1} \right]_{-1}^2$$
$$= \left(\frac{3e^{2(2)}}{2} - \frac{3e^{-(2)}}{-1} \right) - \left(\frac{3e^{2}}{2} - \frac{3e^{-1}}{-1} \right)$$
$$= (82.30) - (12.19)$$
$$= 70.11 \text{ unit}^2$$

2. $A = \int_a^b y dx$ Recall $x = 2 + 2t - 2\cos \frac{\pi}{10}t$
 $= \int_0^{10} (2\sin \frac{\pi}{10}t) dx$ $dx = 2 + 2\sin \frac{\pi}{10}t dt$

$$= \int_0^{10} (2\sin \frac{\pi}{10}t) (2 + 2\sin \frac{\pi}{10}t) dt$$
$$= 2 + 2 \int_0^{10} (2\sin \frac{\pi}{10}t \times \sin \frac{\pi}{10}t) dt$$
$$= 4 [(-2\cos \frac{\pi}{10}t)(-\cos \frac{\pi}{10}t)]_{0}^{10}$$
$$= 4 [(-2\cos \frac{\pi}{10} \times 10)(-\cos \frac{\pi}{10} \times 10)]$$
$$= 4(199.99)$$
$$= 799.98 \text{ unit}^2$$