Sample Exam 4 - Solutions

1. (a) $l(x) = -\dfrac{1}{16}x + \dfrac{3}{4}$

    (b) $dy = -0.01875$

2. Using the linear approximation, $l(x) = \dfrac{1}{27}x + 2$, $l(27.1) = 3.0037$, whereas the actual value $(27.1)^{(1/3)} = 3.003699$, so the linear approximation is a (slight) overestimate.

3. $height = 2 * radius$ and $radius = \dfrac{10}{(2\pi^{(1/3)})}$

4. $radius = perimeter/8.71$, $height = .205 * perimeter$

5. $\dfrac{dA}{dt}$ at $radius = 60$ is $240\pi \, ft^2/s$

6. $\dfrac{dV}{dt}$ at $height = 10$ is $125\pi \, ft^3/m$

7. (a) $\dfrac{3}{7}x^7 - \dfrac{2}{3}x^3 + \dfrac{7}{2}x^2 + x + C$

    (b) $-\dfrac{1}{t} - 2t + C.$

    (c) $28y^{(1/4)} - \dfrac{3}{4}y^{(4/3)} + \dfrac{8}{3}y^{(3/2)} + C$

    (d) 7.5

    (e) $12 + 4(e^2 - e^{-2})$

    (f) 0

8. (a) 0

    (b) 8/3 m

9. 2