

AP Calculus Exam Prep Assignment #4 Name _____

Multiple Choice: No calculator is allowed.

1)

$$u = 2y - 3y^2 \quad du = (2 - 6y)dy \Rightarrow (1 - 3y)dy = \frac{1}{2} du$$

$$\frac{1}{2} \int \frac{du}{\sqrt{u}} = \frac{1}{2} (2\sqrt{u}) + C = \sqrt{2y - 3y^2} + C \quad \mathbf{E)}$$

2) $\int \frac{dy}{\sqrt{y}(1 - \sqrt{y})} =$

$$u = 1 - \sqrt{y} \quad du = -\frac{1}{2\sqrt{y}} dy \Rightarrow \frac{1}{\sqrt{y}} dy = -2du$$

$$\int \frac{-2du}{u} = -2 \ln|u| + C = -2 \ln|1 - \sqrt{y}| + C \quad \mathbf{E)}$$

3)

$$u = (2t)^2 = 4t^2 \quad du = 8t dt \Rightarrow t dt = \frac{1}{8} du$$

$$\int \frac{1}{8} \cos u \, du = \frac{1}{8} \sin u + C = \frac{1}{8} \sin 4t^2 + C \quad \mathbf{A)}$$

4)

$$u = 2y - 3 \quad du = 2dy \Rightarrow dy = \frac{1}{2} du$$

$$\int_1^3 \frac{du}{2u} = \left[\frac{1}{2} \ln u \right]_1^3 = \frac{1}{2} \ln 3 - \frac{1}{2} \ln 1 = \frac{1}{2} \ln 3 \quad \mathbf{D)}$$

5)

$$\int_1^2 \left(\frac{1}{x} - \frac{4}{x^2} \right) dx = \left[\ln x + \frac{4}{x} \right]_1^2 = (\ln 2 + 2) - (\ln 1 + 4) = \ln 2 - 2 \quad \mathbf{B)}$$

6) The area bounded by $y = e^{2x}$, the x-axis, the y-axis, and the line $x = 2$ is:

$$\int_0^2 e^{2x} dx = \frac{1}{2} [e^{2x}]_0^2 = \frac{1}{2} [e^4 - 1] \quad \mathbf{C)}$$