Name: _____

Class: _____

Score: _____

No Work ⇔ No Points

Use Pencil Only ⇔ Be Neat & Organized

1. (3 points) Given the curve $x = t^2 - 1$, $y = t^3 + t$ for $-2 \le t \le 2$, find its initial and terminal points.

1. _____

2. (4 points) Given the curve $x = t^2 - 1$, $y = t^3 + t$, find its $\dfrac{dy}{dx}$ and $\dfrac{d^2y}{dx^2}$.

2. _____

3. (4 points) Discuss increasing, decreasing, and concavity of the curve $x = t^2 - 1$, $y = t^3 + t$.

3. _____

4. (4 points) Consider the curve given by $x = 3e^{-2t} - 1, y = e^{-t}$ for $t \geq 0$, eliminate the parameter then graph the curve.

4. _____

5. (4 points) Consider the curve given by $x = \sin^2 t, y = 1 + \cos t$, eliminate the parameter then graph the curve.

5. _____

6. (5 points) Given the curve $x = \sec t, y = \tan t$, evaluate its $\dfrac{dy}{dx}$ and $\dfrac{d^2y}{dx^2}$ at $t = \pi/3$.

6. _____

7. (4 points) Find the arc length of the curve $x = \frac{1}{3}t^3$, $y = \frac{1}{2}t^2$ for $0 \le t \le 1$.

7. _____

8. (6 points) Find the arc length of the curve $x = e^t \cos t$, $y = e^t \sin t$ for $0 \le t \le \pi/2$.

8. _____

9. (4 points) Find the slope of the tangent line to the curve $x = e^t$, $y = e^{-t}$ at the point where $t = 2$.

9. _____

10. (6 points) Find the area of the surface generated by revolving the curve $x = t^2, y = 2t$ for $0 \leq t \leq 4$ about $x-$axis.

10. _____

11. (6 points) Find the area of the surface generated by revolving the curve $x = \cos^2 t, y = \sin^2 t$ for $0 \leq t \leq \pi/2$ about $y-$axis.

11. _____