A particle’s position on the x-axis is defined by $x(t) = t^3 - 6t^2 + 9t + 7$. Find the interval(s) that the speed of the particle increasing.

Answer : _____________

Round 1 2 3 4 5

A particle’s position on the x-axis is defined by $x(t) = t^3 - 6t^2 + 9t + 7$. Find the interval(s) that the speed of the particle increasing.

Answer : _____________

Round 1 2 3 4 5
\[ \lim_{n \to \infty} \sum_{i=1}^{n} \left( \frac{3 - 5i}{n^2} \right) \]

Answer: _____________

Round 1 2 3 4 5

\[ \lim_{n \to \infty} \sum_{i=1}^{n} \left( \frac{3 - 5i}{n^2} \right) \]

Answer: _____________

Round 1 2 3 4 5
\[ \int \frac{x^3}{x^2 - 1} \, dx \]

Answer: _____________

Round    1    2    3    4    5
Given \( f(x) = 2^x \)  

Find \( f''(x) \)  

Answer: _____________  

Round 1 2 3 4 5
Given $x(t) = e^{\pi t}$ and $y(t) = \cos(\pi t)$

Find $\frac{d^2y}{dx^2}$ at $t = \frac{1}{2}$

Answer: ___________  

Round 1 2 3 4 5
Given $F(x) = \int_{-x^2}^{x} e^t \, dt$

Find $F'(x)$

Answer: _____________

Round 1 2 3 4 5
What is the linear approximation of \( \sqrt{50} \) given \( \sqrt{49} = 7 \)?

Answer: _____________

Round 1 2 3 4 5
Evaluate:

\[
\int_{0}^{\ln \sqrt{3}} \frac{e^x}{\sqrt{4 - e^{2x}}} \, dx
\]

Answer: _____________

Round 1 2 3 4 5

Evaluate:

\[
\int_{0}^{\ln \sqrt{3}} \frac{e^x}{\sqrt{4 - e^{2x}}} \, dx
\]

Answer: _____________

Round 1 2 3 4 5
Find the volume of the solid formed when the graph $9x^2 + 4y^2 - 36x + 56y + 196 = 0$ is revolved about the x-axis.

Answer: _____________

Round 1 2 3 4 5
Evaluate:

\[ \lim_{x \to 0} \left( 1 + \frac{1}{3x} \right)^{3x} \]

Answer: _____________

Round 1 2 3 4 5
Find the slope of the line normal to the curve $x^2y + 3xy^2 = 2$ in quadrant IV when $x = 1$.

Answer: _____________

Round 1 2 3 4 5
Find the rate of change of the volume of a cube in $\text{cm}^3/\text{sec}$ that has surface area changing at a rate of $4 \text{ cm}^2/\text{sec}$ when the volume of the cube is $8 \text{ cm}^3$.

Answer : _____________

Round 1 2 3 4 5

Find the rate of change of the volume of a cube in $\text{cm}^3/\text{sec}$ that has surface area changing at a rate of $4 \text{ cm}^2/\text{sec}$ when the volume of the cube is $8 \text{ cm}^3$.

Answer : _____________

Round 1 2 3 4 5
Given \( f(x) = \sqrt{x + 3\sqrt{x + 3\sqrt{x + 3\ldots}}} \)

Find \( f'(x) \)

Answer: _____________

Round 1 2 3 4 5

Answer: _____________

Round 1 2 3 4 5
Find the interval of convergence of

\[ \sum_{n=0}^{\infty} \frac{(x - 2)^{n+1}}{(n + 1) 4^{n+1}} \]

Answer: _____________

Round 1 2 3 4 5

Find the interval of convergence of

\[ \sum_{n=0}^{\infty} \frac{(x - 2)^{n+1}}{(n + 1) 4^{n+1}} \]

Answer: _____________

Round 1 2 3 4 5
If \( f(x) = \left( \frac{2}{x} + x^2 \right)^9 \), find the coefficient of the \( x^5 \) term of \( f'(x) \).

Answer: _____________

Round 1 2 3 4 5

If \( f(x) = \left( \frac{2}{x} + x^2 \right)^9 \), find the coefficient of the \( x^5 \) term of \( f'(x) \).

Answer: _____________

Round 1 2 3 4 5
Find the particular solution, \( y = f(x) \), to the differential equation \( \frac{dy}{dx} = \frac{y(x + 2)}{x} \) given \( y(1) = 2e \).

Answer : _____________
If \( f(x) = \tan x, -\frac{\pi}{2} < x < \frac{\pi}{2} \) and 
\( f^{-1}(x) = g(x), \) find \( g'\left(\sqrt{3}\right). \)
Find the absolute maximum value of the function $f(x) = 3x^5 - 5x^3 - 1$ on the interval $[-2, 2]$.

Answer: _____________

Round 1 2 3 4 5

Find the absolute maximum value of the function $f(x) = 3x^5 - 5x^3 - 1$ on the interval $[-2, 2]$.

Answer: _____________

Round 1 2 3 4 5
Find the area of ONE petal of the polar graph \( r = 2 \cos(3\theta) \)

Answer: _____________

Round 1 2 3 4 5
Find the volume of the solid formed by revolving the region bounded by \( y = x^2 \), \( y = x + 3 \) and \( x = 0 \), revolved about the x-axis.

Answer: 

Round 1 2 3 4 5
The equation of an ellipse is given by \( \frac{(x-2)^2}{a^2} + \frac{(y+4)^2}{b^2} = 1 \). Find the rate of change in the area of the ellipse in \( \frac{\text{units}}{\text{sec}} \) if the minor axis is decreasing at a rate of 0.4 \( \frac{\text{units}}{\text{sec}} \) and the major axis is increasing at a rate of 0.6 \( \frac{\text{units}}{\text{sec}} \) and the major axis has length 10 units and minor axis has length 6 units.

Answer: _____________

Round: 1 2 3 4 5
If $y = \ln \sqrt[3]{x^6 \sin (3x)}$, find $\frac{dy}{dx}$.

Answer: _____________

Round 1 2 3 4 5
Find the sum of the values for $x$ that satisfy the Mean Value Theorem for Integrals for the function $f(x) = (x - 1)^2$ over the interval $[4, 7]$

Answer: _____________

Round 1 2 3 4 5
Find the coefficient of the \( x^6 \) term of the Taylor expansion of \( f(x) = \cos x \) centered about \( x = \frac{\pi}{6} \).

Answer: _____________

Round 1 2 3 4 5
If \( f\left(\frac{3}{x}\right) = x^2 - 3x \), find \( \frac{d\left[ f\left(\frac{3}{x}\right)\right]}{d\left(2 \ln x\right)} \).

Answer: _____________

Round 1 2 3 4 5