Evaluate: $\lim_{x \to -1} \frac{-3x^2 + 7x - 5}{2x^2 + 8x + 9}$
Evaluate: \( \lim_{x \to -\infty} \frac{-4x^2 + 7x - 5}{\sqrt{4x^4 + 5x^3} - 1} \)
Find the equation, in slope-intercept form, of the tangent to \( y = 4x^3 - 2x + 12 \) at the point where \( x = 2 \).
A rectangle is inscribed in the parabola with equation \( y = x^2 \), on or below the line with equation \( y = 147 \). Find the area enclosed by the largest such rectangle.
Find the domain of the real-valued function

\[ f(x) = \sqrt{1 - \sqrt{2 - \sqrt{3 - x}}} \]

written in interval notation.
A continuous, real-valued function \( f \) satisfies 
\[ f(3x) = 5f(x) \text{ for all } x. \]
Given that 
\[ \int_{0}^{2} f(x) \, dx = 8, \text{ find the value of } \int_{2}^{6} f(x) \, dx. \]
A positive, real-valued function $f$ has domain $[0, \infty)$. A solid is generated by revolving the region bounded by $f$ and the $x$-axis between $x = 0$ and $x = a$, where $a > 0$, about the $x$-axis, resulting in a volume of $a^2$. Find the value of $f(\pi)$. 

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Evaluate:

$$\lim_{n \to \infty} \left( -\frac{1}{n} \sum_{i=0}^{n-1} \left( 5 - 8 \left( \frac{1 - \frac{i}{n}}{2} \right)^3 \right) \right)$$

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Find the solution, in the form \( y = f(x) \), to the initial-value problem \( \ln \left( \frac{dy}{dx} \right) = x - y, \ y(0) = 1 \).
If \( \int_0^{\frac{\sqrt{2}}{4}} \frac{1 - x^2}{1 + x^4} \, dx \) can be written in the form \( \frac{\sqrt{2}}{4} \ln b \), where \( b > 0 \) is real, find the value of \( b \).

(HINT: \( 1 + x^4 = (1 + \sqrt{2}x + x^2)(1 - \sqrt{2}x + x^2) \))
Find the inflection point of the function
\[ y = 3x^5 + 5x^4 - 80x^3 - 360x^2 + 1400x + 72, \]
written as an ordered pair.
The volume of the solid obtained by revolving the region bounded by \( y = \sqrt{2e^x}, y = \sqrt{3x}, x = 0, \) and \( x = 1 \) about the x-axis can be written in the form \( A\pi \), where \( A \) is real. Find the value of \( A \).