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₩ Your answer must be provided with descriptions how to get the answer.	2. (a)(4	points)	Represent	$\operatorname{csch}^{-1}x$	in te	rms	of a	natural
1. Let $f(x) = x - 2\tan^{-1}x$.	logarithmi	c function	on \log_e .		*			
(a)(3 points) Find the derivative $\frac{d}{dx}f(x)$ of $f(x)$.								

(b)(3 points) Find the absolute minimum value of f(x) on the (b)(4 points) Find an equation of the tangent line to the curve interval [-2, 2].

 $y = \operatorname{csch}^{-1} x \text{ at } x = 1.$



3. (a)(4 points) Evaluate the definite integral $I = \int_{1}^{4} \frac{\log_{e} x}{x} dx$.

4. Let \sqrt{a} be a solution to the equation $x^2=a$. To approximate \sqrt{a} , we generate a sequence $\left\{x_n\right\}_{n=0}^{\infty}$ by using the Newton's method with an initial approximate x_0 . (a)(4 points) Find a relation $x_{n+1}=g\left(x_n\right)$ between x_{n+1} and x_n .

(b)(3 points) By using the Trapezoidal Rule with n=3, approximate the integral $I=\int_{-1}^4 \frac{\log_e x}{x}\,dx$. (You do not need to simplify it)

(b)(2 points) Find updated x_1 with initial approximation $x_0=1$ to estimate $\sqrt{3}$.



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5. (a) (4 points) Determine whether the improper integral $\int_{1}^{\infty} \frac{x^{3}}{1+x^{5}} dx$ converges or diverges by using the comparison	n b for the	points) Determine the	conditions $\int_{1}^{\infty} \frac{x^{b}}{1+x^{b}}$	s on real numbers a and $\frac{1}{a} dx$ being convergent.		
theorem.						
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	6.	(5	points)	Evaluate	$\int_{-\pi}^{\pi} \sin(mx) \sin$	n(nx)dx when	m and			
					at $m \neq n$.					
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