Math 1B
Group Quiz 2
Wed Apr 23, 2008

Names: _____

THIS IS A NO CALCULATOR QUIZ

[4 POINTS] Find the equation of the tangent to the function $f(x) = \int_{-1}^{x} e^{1-t^2}\,dt$ at $x = -1$.

$f'(x) = e^{1-x^2}$

$f'(-1) = e^{1-(-1)^2} = e^0 = 1$

$f(-1) = \int_{-1}^{-1} e^{1-t^2}\,dt = 0$

$y - 0 = 1(x - -1)$

$y = x + 1$

1 POINT EACH

[5 POINTS] Find the average value of the function $f(x) = (5x-3)\sqrt{x}$ on the interval $[1, 4]$.

$\frac{1}{4-1}\int_1^4 (5x-3)\sqrt{x}\,dx$

$= \frac{1}{3}\int_1^4 (5x-3)\,x^{\frac{1}{2}}\,dx$

$= \frac{1}{3}\int_1^4 (5x^{\frac{3}{2}} - 3x^{\frac{1}{2}})\,dx$

$= \frac{1}{3}\left(5\cdot\frac{2}{5}x^{\frac{5}{2}} - 3\cdot\frac{2}{3}x^{\frac{3}{2}}\right)\Big|_1^4$

$= \frac{1}{3}\left(2x^{\frac{5}{2}} - 2x^{\frac{3}{2}}\right)\Big|_1^4$

$= \frac{1}{3}\left(2\cdot 4^{\frac{5}{2}} - 2\cdot 4^{\frac{3}{2}} - (2\cdot 1^{\frac{5}{2}} - 2\cdot 1^{\frac{3}{2}})\right)$

$= \frac{1}{3}(64 - 16 - (2-2))$

$= \frac{1}{3}(48) = 16$

SUBTRACT $\frac{1}{2}$ POINT EACH TIME YOU FORGOT TO WRITE "dx"

[1 POINT] Circle the **only** function below to which the Integral Mean Value Theorem applies.

$j(x) = \sec x$ on $\left[0, \frac{\pi}{4}\right]$ $\quad g(x) = \ln x$ on $[0, 3]$ $\quad k(x) = \frac{1}{x}$ on $[-2, 2]$ $\quad f(x) = \frac{1}{x^2-4}$ on $[-2, -1]$

— FUNCTION MUST BE CONTINUOUS ON INTERVAL