Math 1A (7:30am – 8:20am)
Quiz 2 Version F
Fri Apr 15, 2011

NAMES YOU ASKED TO BE CALLED IN CLASS:

_____ & _____

SCORE: ___ / 30 POINTS

NO CALCULATORS ALLOWED

SHOW PROPER ALGEBRAIC WORK (DO NOT USE ANTI-DERIVATIVES)
USE PROPER NOTATION & SIMPLIFY ALL ANSWERS WHERE REASONABLE

State the definition of "definite integral" given in class. SCORE: ___ / 3 POINTS
Use complete sentences and proper algebra & English as shown in class.

SEE 7:30 VERSION D

Evaluate $\int_{-1}^{2}(4x^2-1)\,dx$ using the definition of the definite integral and right hand sums. SCORE: ___ / 8 POINTS

$$\lim_{n\to\infty}\sum_{i=1}^{n}\left(4\left(-1+\frac{3i}{n}\right)^2-1\right)\frac{3}{n}$$ 2

$$=\lim_{n\to\infty}\frac{3}{n}\sum_{i=1}^{n}\left(4\left(1-\frac{6i}{n}+\frac{9i^2}{n^2}\right)-1\right)$$

$$=\lim_{n\to\infty}\frac{3}{n}\sum_{i=1}^{n}\left(3-\frac{24i}{n}+\frac{36i^2}{n^2}\right)$$ 1

$$=\lim_{n\to\infty}\frac{3}{n}\left[\sum_{i=1}^{n}3-\frac{24}{n}\sum_{i=1}^{n}i+\frac{36}{n^2}\sum_{i=1}^{n}i^2\right]$$ 1

$$=\lim_{n\to\infty}\frac{3}{n}\left[3n-\frac{12}{n}\cdot\frac{n(n+1)}{2}+\frac{6}{n^2}\cdot\frac{n(n+1)(2n+1)}{6}\right]$$ 1 1

$$=\lim_{n\to\infty}3\left[3-\frac{12(n+1)}{n}+\frac{6(n+1)(2n+1)}{n^2}\right]$$

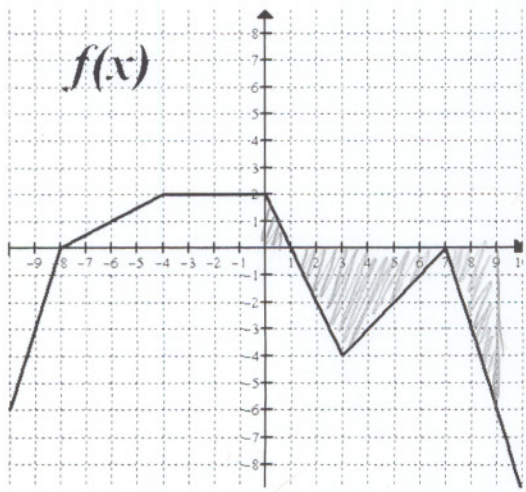
$$=3[3-12+12]$$ 1

$$=9$$ 1

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER SCORE: ___ / 3 POINTS

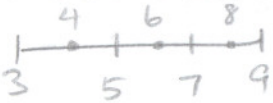
$\int_0^9 f(x)\,dx =$

[a] −17
[b] −5
[c] 2
[d] 5
[e] 9
[f] none of the above



$\frac{1}{2}(2)(1)$
$-\frac{1}{2}(6)(4)$
$-\frac{1}{2}(2)(6)$
$=-17$

If the velocity of a particle at time t is given by $v(t) = t^2 - 9$, estimate the distance travelled by the object from $t = 3$ to $t = 9$ using 3 equal subintervals and the midpoint rule. **SCORE: ___ / 3 POINTS**

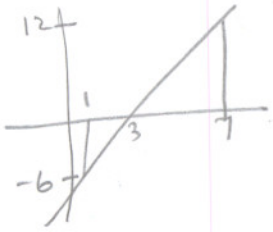


$\Delta x = \frac{9-3}{3} = 2$

$(4^2-9)2 + (6^2-9)2 + (8^2-9)2 = 7\cdot 2 + 27\cdot 2 + 55\cdot 2 = 178$ (1)

OR (2)

Evaluate $\int_1^7 (3x-9)\,dx$ using geometry. **Sketch a diagram and show the calculations used.** **SCORE: ___ / 3 POINTS**



$-\frac{1}{2}(6)(3-1) + \frac{1}{2}(12)(7-3) = -\frac{1}{2}(6)(2) + \frac{1}{2}(12)(4)$ (2)

OR

$= -6 + 24$

$= 18$ (1)

Write $\lim_{n\to\infty} \sum_{k=1}^{n} \frac{2}{n} \arctan\left(4 + \frac{2k}{n}\right)$ as a definite integral. **Do NOT evaluate the limit/definite integral.** **SCORE: ___ / 3 POINTS**

$\int_{\frac{1}{2}}^{6} \arctan x \, dx$ (1) $\frac{1}{4}$ $\frac{1}{4}$

Write $\int_{-2}^{-4} g(x)\,dx - \int_{4}^{2} g(x)\,dx + \int_{-4}^{2} g(x)\,dx$ as a single integral in the form $\int_a^b g(x)\,dx$. **SCORE: ___ / 3 POINTS**

Show each step CLEARLY.

SEE 7:30 VERSION D

If $\int_3^7 g(x)\,dx = -6$, find $\int_7^3 (2 + g(x))\,dx$. **Show each step CLEARLY.** **SCORE: ___ / 4 POINTS**

$= -\int_3^7 (2+g(x))\,dx$ (1)

$= -\left[\int_3^7 2\,dx + \int_3^7 g(x)\,dx\right]$ (1)

$= -[2(7-3) + -6]$ (1)

OR $= -[8-6] = -2$ (1)

OR

$= \int_7^3 2\,dx + \int_7^3 g(x)\,dx$ (1)

$= 2(3-7) - \int_3^7 g(x)\,dx$ (1)

$= -8 - (-6)$ (1)

$= -2$ (1)