Math 1B (9:30am – 10:20am)
Quiz 1 Version C
Fri Apr 16, 2010

SCORE: ___ / 30 POINTS

What month is your birthday ? ___ ___
What are the first 2 digits of your address ? ___ ___
What are the last 2 digits of your zip code ? ___ ___
What are the last 2 digits of your social security number ? ___ ___
[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER, USE YOUR STUDENT ID NUMBER]

NO CALCULATORS ALLOWED

YOU MUST SHOW PROPER CALCULUS LEVEL WORK

State the definition of "definite integral". **SCORE: ___ / 2 POINTS**

SEE 7:30 VERSION A KEY

State the Fundamental Theorem of Calculus Part 1. **SCORE: ___ / 2 POINTS**

SEE 7:30 VERSION A KEY

Use the definition of the definite integral, and right endpoints, to evaluate $\int_{-1}^{3} (2+4x)\,dx$. **SCORE: ___ / 6 POINTS**

$\lim_{n\to\infty} \sum_{i=1}^{n} f(-1+\frac{4i}{n})\frac{4}{n}$

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

$= \lim_{n\to\infty} \frac{4}{n}\sum_{i=1}^{n} (-2+\frac{16i}{n})$ (1)

$= \lim_{n\to\infty} \frac{4}{n}\left(\sum_{i=1}^{n} -2 + \frac{16}{n}\sum_{i=1}^{n} i\right)$ (½) (½)

$= \lim_{n\to\infty} \frac{4}{n}\left(-2n + \frac{16}{n}\cdot\frac{n(n+1)}{2}\right)$ (½) (½)

$= \lim_{n\to\infty} 4\left(-2+\frac{8(n+1)}{n}\right)$ (½)

$= 4(-2+8)$

$= 24$ (½)

Suppose $\int_1^2 \arctan x\,dx = 1.0$, $\int_2^5 \arctan x\,dx = 3.8$ and $\int_3^5 \arctan x\,dx = 2.6$. **SCORE: ___ / 8 POINTS**

[a] Find $\int_5^3 (7-4\arctan x)\,dx$.

$= \int_5^3 7\,dx - 4\int_5^3 \arctan x\,dx$ (½) (1)

$= 7(3-5) + 4\int_3^5 \arctan x\,dx$ (½)

$= -14 + 4(2.6)$ (1)

$= -3.6$ (1)

[b] Find $\int_1^3 \arctan x\,dx$. **HINT: Find** $\int_1^5 \arctan x\,dx$.

$= \int_1^2 \arctan x\,dx + \int_2^5 \arctan x\,dx$ (1)

$+ \int_5^3 \arctan x\,dx$ (½)

$= 1.0 + 3.8 - \int_3^5 \arctan x\,dx$ (½)

$= 4.8 - 2.6 = 2.2$ (1)

(1)

FOR THE FOLLOWING QUESTIONS, YOU MUST SHOW HOW YOU FOUND YOUR ANSWERS. HOWEVER, YOU DO NOT HAVE TO USE FORMAL CALCULUS NOTATION.

The velocity of a car as a function of time $v(t)$ is shown in the graph below. **SCORE: ___ / 3 POINTS**

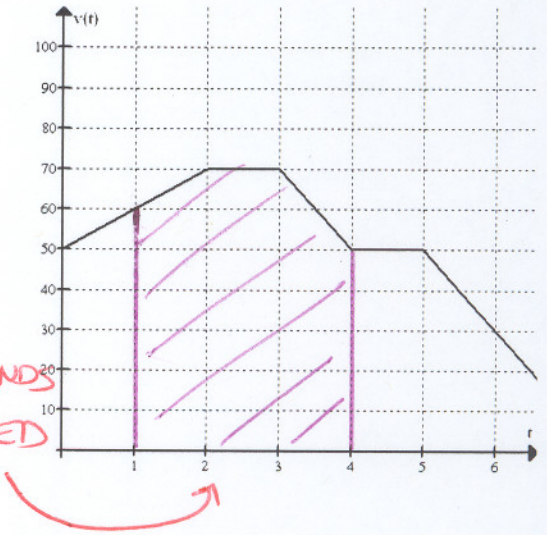
Find the total distance travelled by the car from $t = 1$ to $t = 4$.

$\frac{1}{2}(60+70)1 + 70(1) + \frac{1}{2}(70+50)1$ (2)

$= 65 + 70 + 60$

$= 195$ (1)

CAN USE ANY CALCULATION WHICH CORRESPONDS TO PURPLE SHADED AREA



The graph of $f(t)$ shown below consists of 3 semicircles of radii 1, 2 and 3. Let $g(x) = \int_{-4}^{x} f(t)\,dt$. **SCORE: ___ / 6 POINTS**

[a] Find $g(4)$.

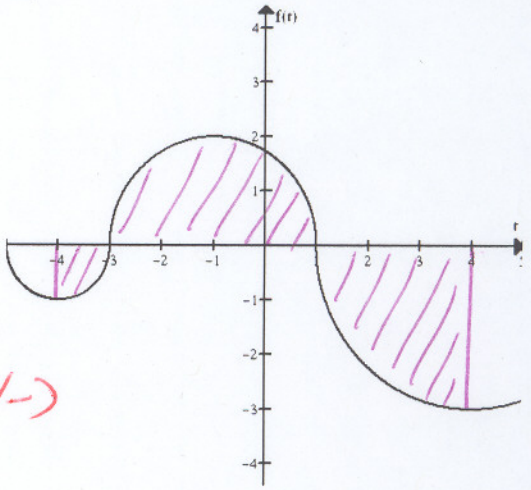
(1) $-\frac{1}{4}\pi(1)^2 + \frac{1}{2}\pi(2)^2 - \frac{1}{4}\pi(3)^2$ (1)

$= -\frac{\pi}{4} + 2\pi - \frac{9\pi}{4}$ (1)

$= -\frac{\pi}{2}$ (1) ← NO PARTIAL CREDIT IF THIS IS WRONG DUE TO SIGN (+/-) ERROR ABOVE

[b] Find $g'(4)$.

$g'(4) = f(4) = -3$ (1) (1)



The graph of $f(x)$ is shown below. Estimate $\int_{2}^{8} f(x)\,dx$ using 3 subintervals with midpoints. **SCORE: ___ / 4 POINTS**

$\Delta x = \frac{8-2}{3} = 2$ (1/2)

INTERVALS = $[2,4], [4,6], [6,8]$

MIDPOINTS = 3 , 5 , 7

$f(3)\Delta x + f(5)\Delta x + f(7)\Delta x$

(1) $= 2(2) + 7(2) + 10(2)$ (1) (1)

$= 38$ (1/2)