Quiz 8

Key

This is a two-stage quiz. During the first stage, use a one-sided 8.5" by 11" sheet of notes & calculator. You have 15 min. In the second stage, you are now welcome to use your books, notes, and students in the class to retake the same quiz. You have the remainder of the quiz time to write one solution (with everyones name on it!!!) to be turned in for the group.

1. Consider the contour lines of the function $f(x, y)$ shown below.

Integration Activity #1

(a) [4] Use Riemann sums to approximate the (signed) volume captured between $f(x, y)$ & the xy plane over R where R is defined by $2 \le x \le 5$, and $0 \le y \le 2$. Clearly indicate how many rectangular prisms you are using & values used.

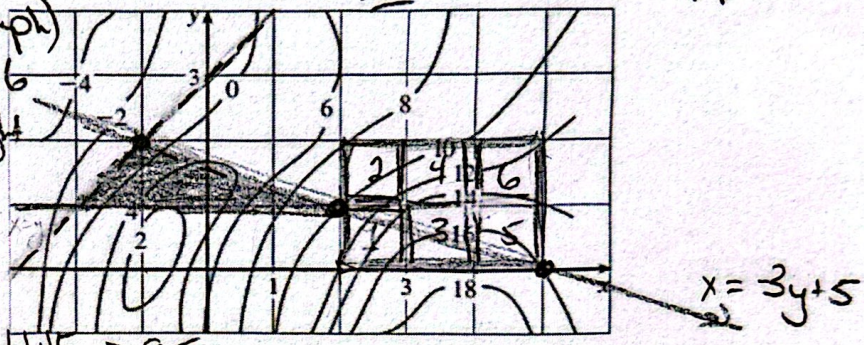
(+1) I'll use 6 prisms (outlined on contour graph) — There are lots of correct approx

Vol 1 + Vol 2 + Vol 3 + Vol 4 + Vol 5 + Vol 6

(+2) recall Vol = length · width · height (length = 1, width = 1)

(+.5) choose bottom left of box for height of prism

(+.5) $1\cdot1\cdot12 + 1\cdot1\cdot10 + 1\cdot1\cdot17 + 1\cdot1\cdot14 + 1\cdot1\cdot17 + 1\cdot1\cdot15 = 85$



(b) [2] Consider $\int_1^2 \int_{y-3}^{-3y+5} f(x, y)\, dx\, dy$. Sketch and shade the region of integration on the graph with the contour lines above.

§15.2 #28

start (+.5)

(+.5) $x = -3y + 5$, $-\frac{1}{3}(x-5) = y$ thru $(-1, 2)$ (+.5)

$x = y - 3$, $x + 3 = y$ thru $(-1, 2)$ (+.5) $y = 2$ and $y = 1$

Webwork 5.1 #5

2. [2] Find $\int_0^4 \int_0^{\pi/4} x \sec^2(y)\, dx\, dy$

Lots of ways to do this problem

technology or algebra/

treat y as const (+1) int/plug in limits (+.5)

(+1.5) [undefined when

(+.5) [b/c @ $y = \pi/2$ $\sec^2(y)$ is undefined

$\int_0^4 \frac{1}{2}x^2 \sec^2(y)\Big|_0^{\pi/4} dy = \int_0^4 \frac{1}{2}\left(\frac{\pi}{4}\right)^2 \sec^2(y) - 0\, dy$

$= \frac{\pi^2}{8}\int_0^4 \sec^2(y)\, dy$ note $\sec(y)$ is not defined at $\pi/2$

$\Rightarrow$ can't use FTC-bg. (+.5)

3. [2] Find a formula for the general term a_n where $\{a_n\}_{n=-1}^{\infty} = \{\frac{-1}{5}, \frac{1}{10}, \frac{-1}{15}, \frac{1}{20}, \ldots\}$

Webwork 11.1 #4,5

$\frac{(-1)^1}{5\cdot1}, \frac{(-1)^2}{5\cdot2}, \frac{(-1)^3}{5\cdot3}$ indexing (+.5)

~~algebra~~/logic/analysis (+.5)

$a_n = \frac{(-1)^n}{5(n+2)} = \frac{(-1)^n}{5n+10}$ 1

(+.5) negative one (+.5) inc. by 5 each time