Quiz 2

Davis
M211

Name:
Pledge:

(9pts.) 1. Use integration tables to integrate the following:

a. $\int \frac{y^2+4y+6}{y^2+4y+5}dy$

$y + \arctan(y+2) + C$

b. $\int (x^3 - 5x + 2)e^{-2x}dx$

$-e^{-2x}(\frac{1}{2}(x^3 - 5x + 2) + \frac{1}{4}(3x^2 - 5) + \frac{1}{8}(6x) + \frac{6}{16})$

c. $\int \sin^4(x)\cos^2(x)dx$

$\frac{1}{6}\sin^5 x \cos x - \frac{1}{24}\sin^3 x \cos x - \frac{1}{16}\sin x \cos x + \frac{1}{16}x + C$

(11pts.) 2. Given the picture of $y = e^{-.01x^2}$, set up (but do not evaluate) sums which can be used to approximate the area under the curve from 1 to 3, subdividing the interval into 8 regions, using:

a. Left-hand Riemann sum /Library/classes/212f99/quiz2pic.eps /Library/classes/212f99/quiz2pic.eps

/Library/classes/212f99/quiz2pic.epsGraphic file (type eps)

$\sum_{i=0}^{7} f(1 + \frac{i}{4})\frac{1}{4}$: this is an overestimate because the rectangles hang over the curve (draw picture).

b. Right-hand Riemann sum

$\sum_{i=1}^{8} f(1 + \frac{i}{4})\frac{1}{4}$: this is an underestimate because the rectangles fall below the curve (draw picture).

c. Trapezoid rule

$\frac{LHS+RHS}{2}$: when you connect the endpoints, the trapezoid falls below the curve, so this is an underestimate.

d. Midpoint rule

$\sum_{i=0}^{7} f(1 + \frac{2i+1}{8})\frac{1}{4}$: this is an overestimate because the trapezoid with top edge the tangent to the curve at the midpoint hangs over the curve (draw picture).

e. Simpson's rule

$\frac{2Mid(8)+Trap(8)}{3}$

In each case (except Simpson's rule), indicate whether the estimate is an overestimate or an underestimate and explain why (based on the picture).