AMSC/CMSC 460 Quiz 4 , Fall 2001

Show all work. You may leave arithmetic expressions in any form that a calculator could evaluate. By putting your name on this paper, you agree to abide by the university's code of academic integrity in completing the quiz. Use no books, calculators, cellphones, communication with others, scratchpaper, etc.

Name _____

Student number _____

1. (10) Use the composite trapezoidal rule with 4 panels to compute an approximation to

$$\int_0^1 x^3 dx\,.$$

Answer: See notes, part 1, p 6. The approximation is

$$\frac{1}{4}\left[\left(\frac{1}{4}\right)^3 + \left(\frac{1}{2}\right)^3 + \left(\frac{3}{4}\right)^3 + \frac{1}{2}\right].$$

(This gives an approximation with an error of 1/64.)

2. (10) Let

$$I = \int_2^3 \int_{-1}^{x} x^2 \cos(xy^2)\, dy\, dx\,.$$

Given a Matlab integration function `quad(a,b,'f')` that computes an approximation to

$$\int_a^b f(t)dt$$

write code to compute an approximation to I.
Answer: See "unquiz" on notes, part 2, p.25. I'll call the approximation `Iapprox`.

```
Iapprox = quad(2,3,'g')

function z = g(x)
global xx
xx = x;
z = quad(-1,x,'f');

function z = f(y)
global xx
z = xx*xx * cos(xx*y*y);
```

Note: This answer oversimplifies a bit, since `quad` may pass a vector of arguments instead of a single value, so `f.m` should use the "dot" commands and `g.m` should run a loop and use one element of x at a time to compute one element of z.