

Homework 10

due December 2, 2015

In addition to

11.11 5, 13, 23, 26, 27

10.1 2, 4, 7, 8, 10, 13, 16, 18, 20, 21, 24, 25, 28, 31, 38, 42, 46

10.2 4, 6, 7, 8, 10, 11, 14, 17, 20, 25, 28, 31, 32, 34, 38, 41, 44, 46, 48, 52, 58, 60, 62, 65, 69, 70

(**note:** you can do what you want for sketching, even by hand. But Matlab works too!)

complete the following problems:

Additional problems

1. Derive Simpson's rule and the associated error using Taylor series. Hint: use a Taylor series about x_{2i+1} , mid-point of the interval $[x_{2i}, x_{2i+2}]$, and integrate from x_{2i} to x_{2i+2} . You'll need the approximation for the second derivative,

$$f''(x_{2i+1}) = \frac{f(x_{2i}) - 2f(x_{2i+1}) + f(x_{2i+2}))}{h^2} - \frac{h^2}{12} f^{(4)}(x_{2i+1}).$$

Challenge problem: A plane curve is parametrized by $x(t) = \int_t^\infty \frac{\cos u}{u} du$ and $y(t) = \int_t^\infty \frac{\sin u}{u} du$ for $1 \leq t \leq 2$. What is the length of the curve?

TO BE GRADED

11.11 5, 13, 23, 26, 27

10.1 4, 8, 10, 13, 18, 21, 24, 25, 28, 38, 42, 46

10.2 4, 6, 8, 10, 14, 17, 20, 25, 28, 34, 44, 46, 48, 52, 60, 62, 65

Challenge problem