

- 1) Consider the definite integral

$$\int_0^2 \frac{x^2 - 1}{x - 1} dx.$$

- a) (1 pt) There is a substantial theoretical problem with this integral. What is it?
b) (1 pt) Does the integral have a value (you can use the Wolfram Alpha site to answer this)?
c) (2 pts) Can MATLAB's `integral` function obtain a value for this? How accurate is the `integral` function in this case?
- 2) (2 pts) It is known that

$$\int_0^\infty e^{-x^2} dx = \frac{\sqrt{\pi}}{2}$$

however, this result can't be obtained using the fundamental theorem of calculus. It requires some trickery to arrive at this conclusion.

Can MATLAB's `integral` function obtain a value for this? If so, how accurate is the `integral` function in this case?

- 3) (3 pts) What happens if you try to compute

$$\int_{-1}^1 \frac{1}{x^2} dx$$

using the `integral` function? Why does this happen?