exercise 1:

Let f and g be two functions from [0, 1] to \mathbb{R} such that f(0) = 0 and $g(t) = (f(\sqrt{t}))^2$. (i) If f is differentiable at 0, show that g is differentiable at 0.

(ii) Is the function h from [0,1] to $\mathbb R$ defined by

$$h(x) = (\int_0^{\sqrt{x}} e^{-t^2} dt)^2$$

differentiable?

<u>exercise 2</u>: 8.3.D.

 $\underline{\text{exercise } 3}$:

8.3.F. **Hint:** Apply results covered in class for t between $-1 + \frac{1}{n}$ and $1 - \frac{1}{n}$. Then let n tend to infinity.

 $\underline{\text{exercise } 4}$:

8.3.H. Hint: Set $G(x,y) = \int_0^y f(x-t)d(t)dt$ for $0 \le x \le 1, 0 \le y \le x$.