

7. [10 points] Consider the function F defined for all x by the formula

$$F(x) = \int_7^{x^2} e^{-t^2} dt.$$

a. [1 point] Find a number $a \geq 0$ so that $F(a) = 0$.

b. [4 points]

(i) Calculate $F'(x)$. Your answer should not contain any integrals.

(ii) Is $F(x)$ increasing on the entire interval $[1, 8]$? Why or why not?

c. [3 points] Write out each term of a MID(3) estimate of $F(5)$.

(You do **not** need to find or approximate the numerical value of your answer.)

d. [2 points] Is your answer to part (c) an overestimate or underestimate of $F(5)$? Briefly explain your reasoning.