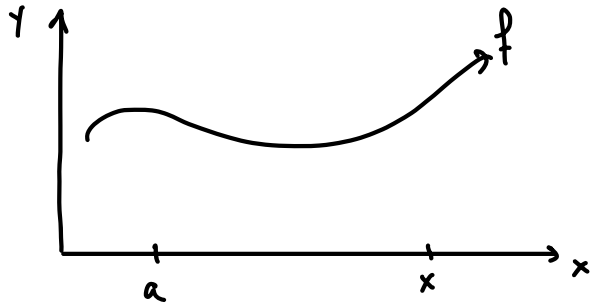
# MATH 122

THE FUNDAMENTAL THEOREM OF CALCULUS

GOALS

- ☐ BE ABLE TO STATE AND EXPLAIN BOTH PARTS OF THE FTC
- ☐ USE FTC TO EVALUATE DEFINITE INTEGRALS
- ☐ USE FTC TO SIMPLIFY EXPRESSIONS LIKE $\frac{d}{dx}\left(\int_a^x f(t)\,dt\right)$
  - ☐ INCLUDE THE CHAIN RULE

DEFINE $F(x) = \int_a^x f(t)\,dt$




COMPUTE $F'$:

$F'(x) =$

e.g. $\frac{d}{dx}\int_1^x e^{t^2}\,dt =$

PART 2: $\int_a^b f(x)\,dx =$

- F is AN _____

- NOTATION: $F(x)\Big|_a^b$

e.g. $\int_0^2 x^2 dx =$

Ex: $\int_0^{\pi/2} \cos(x)\,dx =$

## TRICKIER PART 1 QUESTIONS

Ex: $\frac{d}{dx} \int_x^1 \tan(t^2)\,dt$

Ex: $\frac{d}{dx} \int_2^{x^3} \sqrt{t^4 + 1}\, dt$

Ex: $\frac{d}{dx} \int_0^{\tan x} e^t dt =$