

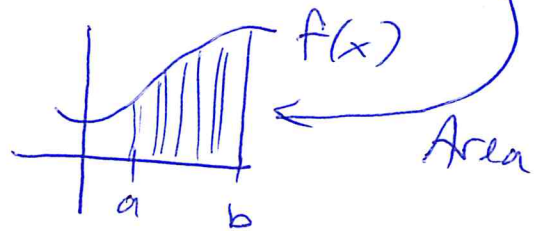
## 4-1 Obj:

to find antiderivatives / indefinite integrals.

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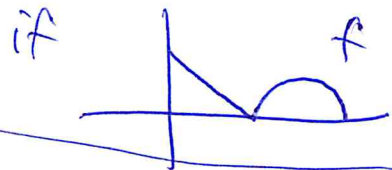
Definite Integrals

$$\int_a^b f(x) dx$$



-  $L_f, R_f, T_f, M_f$   
Left(4)

- Use Tri, Rect, Trap, Circle  
Area Formulas



Indefinite Integral

$$\int f(x) dx$$

= Antiderivative  
OR ~~the~~ general solution

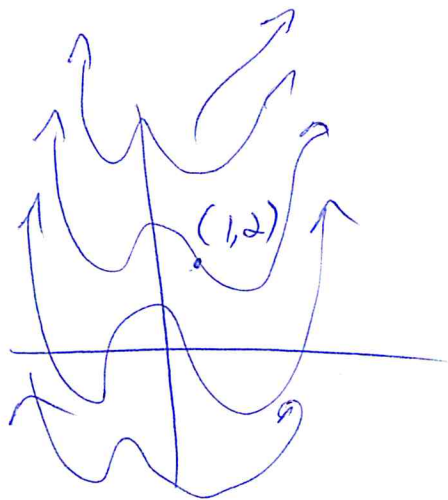
$$\int \boxed{x(x^2 - x)} dx \quad \leftarrow F(x)$$

rewrite

$$\int x^3 - x^2 dx$$

$$= \frac{1}{3+1} x^{3+1} - \frac{1}{2+1} x^{2+1} + C$$

$$= \boxed{\frac{1}{4} x^4 - \frac{1}{3} x^3 + C} = F(x)$$



if  $F(1) = 2$ , find the particular solution

$$\frac{1}{4} (1)^4 - \frac{1}{3} (1)^3 + C = 2$$

$$C = 2 - \frac{1}{4} + \frac{1}{3}$$

$$C = \frac{25}{12}$$

$$\therefore \boxed{\frac{1}{4} x^4 - \frac{1}{3} x^3 + \frac{25}{12}}$$

Ex  $f(x) = \frac{x^2 - x}{x^2}$ , Find the antiderivative.

$$f(x) = \frac{x^2}{x^2} - \frac{x}{x^2}$$

$$f(x) = \cancel{1} - \frac{1}{x} \quad \leftarrow x^{-1}$$

$$F(x) = \boxed{x - \ln|x| + C}$$

Solve  
Ex: ~~y'~~  $\frac{dy}{dx} = e^x + \sin x$

Solution  $y = e^x - \cos x + C$

Do #11 to #31 & #48.  
↳ good!

#29

~~$\int 4^x dx$~~   
 $\int 2x - 4^x dx$   
 $= 2 \cdot \frac{1}{2} x^2 - \frac{1}{\ln 4} 4^x + C$   
 $= x^2 - \frac{1}{\ln 4} 4^x + C$

It's good!  
I'm beautiful &  
talented!