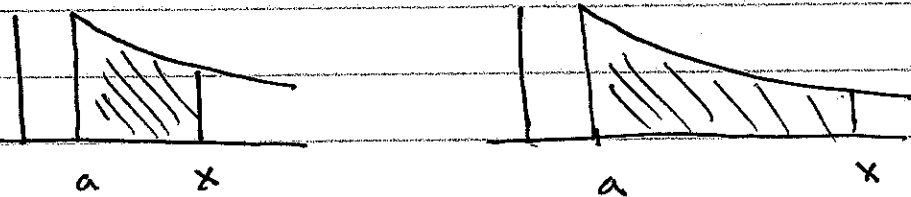


### 5.3 E FTC, part 1

Let  $F(x)$  be the accumulated area function under the curve  $y = f(t)$  from  $x=a$  to  $x$



Then

$$F'(x) = f(x)$$

Ex

$$g(x) = \int_1^x \sqrt{t^5 + t + 1} dt$$

$$g'(x) = \sqrt{x^5 + x + 1}$$

$$h(x) = \int_7^x \tan t + \ln t dt$$

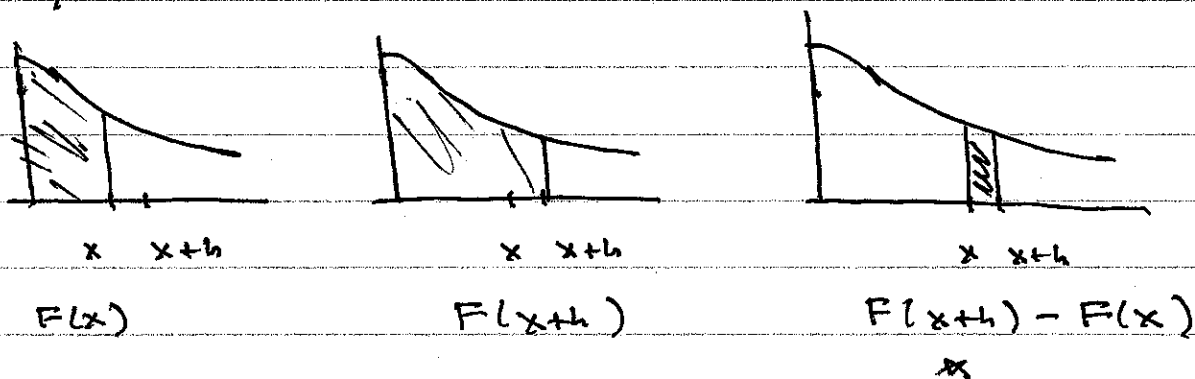
$$h'(x) = \tan x + \ln x$$

$$j(x) = \int_{-1}^x 5 dt$$

$$j'(x) = 5$$

5.3 E 2

Why?  $F'(x) = \lim_{h \rightarrow 0} \frac{F(x+h) - F(x)}{h}$



\* this is approximately a rectangle of width  $h$  and height  $f(x)$  so

$$F(x+h) - F(x) \approx h f(x)$$

$$\frac{F(x+h) - F(x)}{h} \approx f(x)$$

$$F'(x) = \lim_{h \rightarrow 0} \frac{F(x+h) - F(x)}{h} = \lim_{h \rightarrow 0} f(x) = f(x)$$