November 9, 2026

National Fried Chicken Sandwich Day

Today in History:

Berlin Wall opens (1989)

Number of the Day: 902

902 = 2 x 11 x 41

902 is a multiple of 11 such that sum of its digits is also a multiple of 11.

Fun Fact:

A “coward” was a boy who took care of cows.

Quote of the Day:

"If you are going through hell, keep going."

- Sir Winston Churchill

Today’s Weather:

Partly cloudy, high of 51^{o}.

Math 121 - Quiz #37

Find

$$\int_1^3 \frac{x^2+1}{x^2}\,dx$$

$= \int_1^3 \left(1 + \frac{1}{x^2}\right) dx = x - \frac{1}{x}\Big|_1^3$

$\left(3 - \frac{1}{3}\right] - (1-1) = 3 - \frac{1}{3} = \frac{8}{3}$

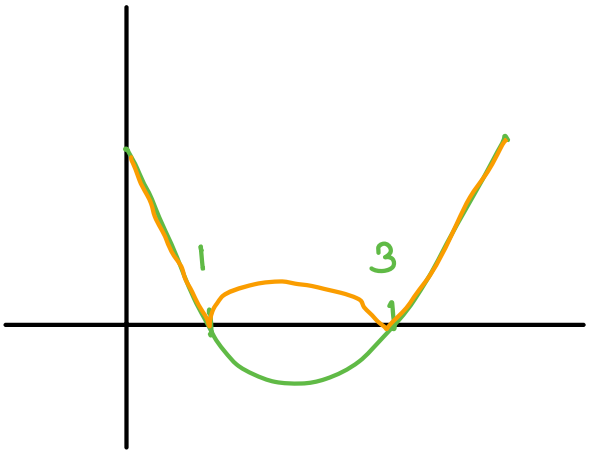
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mpod #6

$$\int_0^5 |x^2 - 4x + 3|\,dx$$

$y = x^2 - 4x + 3$

$y = |x^2 - 4x + 3|$



$$\int_0^5 |x^2 - 4x + 3|\,dx = \underset{①}{\int_0^1 |x^2 - 4x + 3|\,dx} + \underset{②}{\int_1^3 |x^2 - 4x + 3|\,dx}$$

$$+ \int_3^5 |x^2-4x+3|\,dx \quad (3)$$

(1) $$\int_0^1 (x^2-4x+3)\,dx = \frac{x^3}{3} - 2x^2 + 3x \Big|_0^1$$

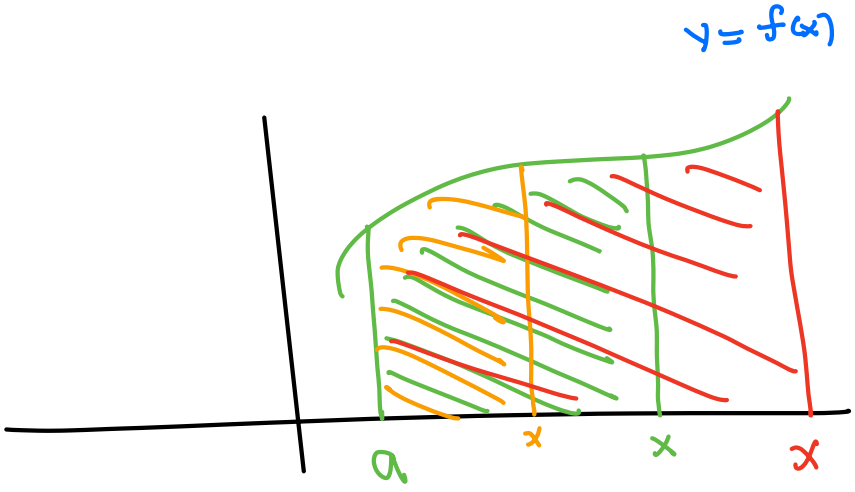
$$= \frac{1}{3} - 2 + 3$$

(2) $$\int_1^3 |x^2-4x+3|\,dx = -\int_1^3 (x^2-4x+3)\,dx$$

$$-\left(\frac{x^3}{3} - 2x^2 + 3x \Big|_1^3\right)$$

(3) $$\int_3^5 (x^2-4x+3)\,dx$$

FTC II

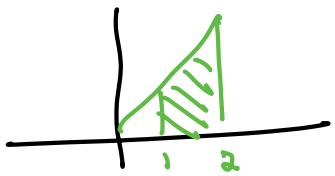


$$A(x) = \int_a^x f(t)\,dt \qquad A(a) = \int_a^a f(t)\,dt = 0$$

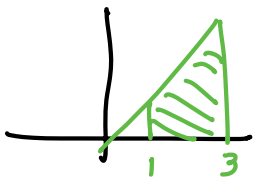
$f(x) = x$ $\quad a = 1$

$$A(x) = \int_1^x t\,dt = \frac{t^2}{2}\Big|_1^x = \frac{x^2}{2} - \frac{1}{2}$$

$$A(2) = \frac{2^2}{2} - \frac{1}{2} = \frac{3}{2}$$



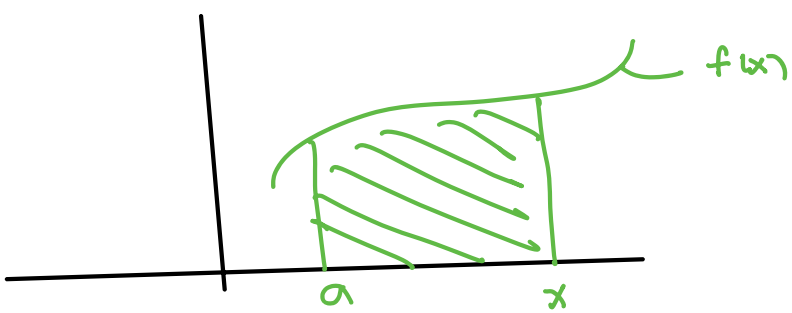
$$A(3) = \frac{3^2}{2} - \frac{1}{2} = 4$$



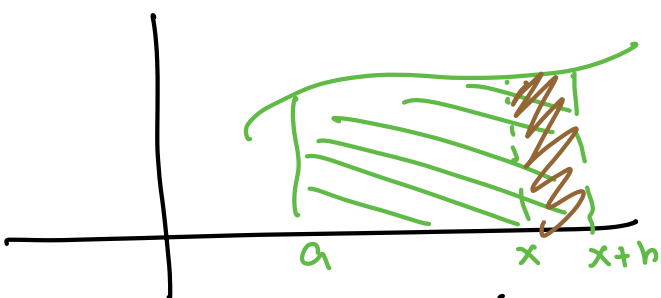
$$A(x) = \int_a^x f(t)\,dt$$

$$A'(x) = \lim_{h \to 0} \frac{A(x+h) - A(x)}{h}$$

$A(x) =$



$A(x+h)$



$A(x+h) - A(x) =$



$$A(x+h) - A(x) = h\, f(x)$$

$$A'(x) = \lim_{h \to 0} \frac{A(x+h) - A(x)}{h} = \lim_{h \to 0} \frac{h\, f(x)}{h}$$

$$= f(x)$$

$$A(x) = \int_a^x f(t)\, dt \qquad A'(x) = f(x)$$

FTC II

① $f(x) = x \qquad a = 1$

$$A(x) = \int_1^x t\, dt = \frac{t^2}{2}\Big|_1^x = \frac{x^2}{2} - \frac{1}{2}$$

$$A'(x) = x$$

② $f(x) = \sin x \qquad a = 0$

$$A(x) = \int_0^x \sin t\, dt = -\cos t \Big|_0^x$$

$$= -\cos x + 1$$

$$A'(x) = \sin x$$

③ $f(x) = \sqrt{x^3 + 1} \qquad a = 0$

$$A(x) = \int_0^x \sqrt{t^3+1}\, dt$$

$$A'(x) = \sqrt{x^3+1}$$

(4) $$f(x) = \frac{x^2}{x^3+x^2+x+1} \qquad a = 0$$

$$A(x) = \int_0^x \frac{t^2}{t^3+t^2+t+1}\, dt$$

$$A'(x) = \frac{x^2}{x^3+x^2+x+1}$$

(5) $$\frac{d}{dx}\left(\int_3^x \frac{e^t}{\sin t + \ln t}\, dt\right)$$

$$= \frac{e^x}{\sin x + \ln x}$$

(6) $$\frac{d}{dx}\left(\int_{(x)}^{1} \sqrt{t+t^2}\, dt\right)$$

$$= \frac{d}{dx}\left(-\int_1^x \sqrt{t+t^2}\, dt\right)$$

$$= -\sqrt{x+x^2}$$

(7) $\frac{d}{dx}\left(\int_1^{e^x} \sin(t)\,dt\right)$

$\frac{d}{dx}\left[-\cos t\Big|_1^{e^x}\right]$

$\frac{d}{dx}\left[-\cos(e^x)+\cos(1)\right]$

$\rightarrow e^x \sin(e^x)$

CHAIN RULE

$e^x \sin(e^x)$

(8) $\frac{d}{dx}\left[\int_2^{\sin x} t^2\,dt\right]$

$(\sin^2 x)(\cos x)$

$\frac{d}{dx}\left[\frac{t^3}{3}\Big|_2^{\sin x}\right]$

$\frac{d}{dx}\left[\frac{\sin^3 x}{3}-\frac{8}{3}\right]$

$\frac{1}{3}\cdot 3(\sin^2 x)(\cos x)$

(9) $\frac{d}{dx}\left[\int_3^{\ln x} \frac{t^2}{t^3+1}\,dt\right] = \frac{(\ln x)^2}{(\ln x)^3+1}\cdot\frac{1}{x}$

(10) $\frac{d}{dx}\left[\int_1^{x^3} \tan(t^2)\,dt\right]$

$\left[\tan\left((x^3)^2\right]\right] \cdot 3x^2$

$3x^2 \tan(x^6)$

(11) $\frac{d}{dx}\left[\int_{\sin x}^{\cos x} \frac{t^2+5}{e^t}\,dt\right]$

$\frac{(\cos x)^2+5}{e^{\cos x}} \cdot (-\sin x) - \frac{\sin^2 x+5}{e^{\sin x}} \cdot \cos x$

(12) $\frac{d}{dx}\left[\int_3^7 \frac{e^t+\sin t}{\ln t}\,dt\right] = 0$