$$h(x) = \int_{-5}^{x} f(t)\,dt = F(x) - F(-5)$$

$$g(x) = \int_{0}^{x} f(t)\,dt = F(x) - F(0)$$

$$\int f(x)\,dx = F(x) + C$$

$$k(x) = \int_{1}^{x} f(t)\,dt = F(x) - F(1)$$

Let $F(x)$ be an antiderivative of $f(x)$ $\left(F'(x) = f(x)\right)$

$$\int_a^b f(x)\,dx = F(b) - F(a)$$

$$\frac{d}{dx}\int_a^x f(t)\,dt = \frac{d}{dx}\left[F(x) - F(a)\right]$$

$$= f(x)$$

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$F(x)$ is an antiderivative of $f(x)$

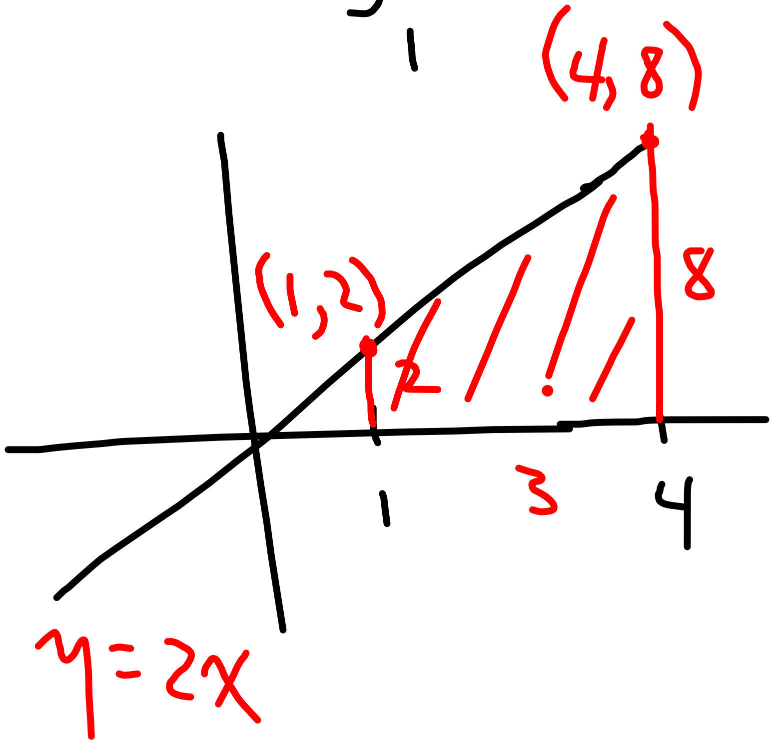
$F'(x) = f(x)$

$F(x)$	$f(x)$
$\sin x$	$\cos x$
$\tan x$	$\sec^2 x$
$\cot x$	$-\csc^2 x$
$\csc x$	$-\csc x \cot x$
$\ln x$	$\frac{1}{x}$
$\log_a x$	$\frac{1}{x \ln a}$ or $\frac{1}{x} \cdot \frac{1}{\ln a}$
e^x	e^x
a^x	$a^x \ln a$

$$\int_1^4 2x\,dx = x^2\Big|_1^4$$

$$= 16 - 1$$

$$= 15$$



Title: Feb 12-11:46 AM (3 of 7)

$$\frac{d}{dx}\int_5^x \cos\sqrt{2t+1}\,dt = \cos\sqrt{2x+1}$$

$$\frac{d}{dx}\int_3^x \cos\sqrt{2t+1}\,dt = \cos\sqrt{2x+1}$$

$$\frac{d}{dq}\int_q^3 2t\,dt = -\frac{d}{dq}\int_3^q 2t\,dt$$

$$= -2q$$

$$\frac{d}{dq}\left[\int_q^3 f(t)\,dt\right] = \frac{d}{dq}\left[F(3)-F(q)\right]$$

$$= -f(q)$$

$$-2q$$

$\frac{d}{dx}\int_0^{x^2}\cos t\,dt = \cos u \cdot 2x$
$= \cos x^2 \cdot 2x$
$= 2x\cos x^2$

$$\frac{dy}{dx} = \frac{dy}{du}\cdot\frac{du}{dx}$$

$$y = \int_0^{x^2}\cos t\,dt \qquad u = x^2$$

$$\frac{du}{dx} = 2x$$

$$\frac{d}{du}\int_0^{u}\cos t\,dt = \cos u$$

$$u = \cos x$$

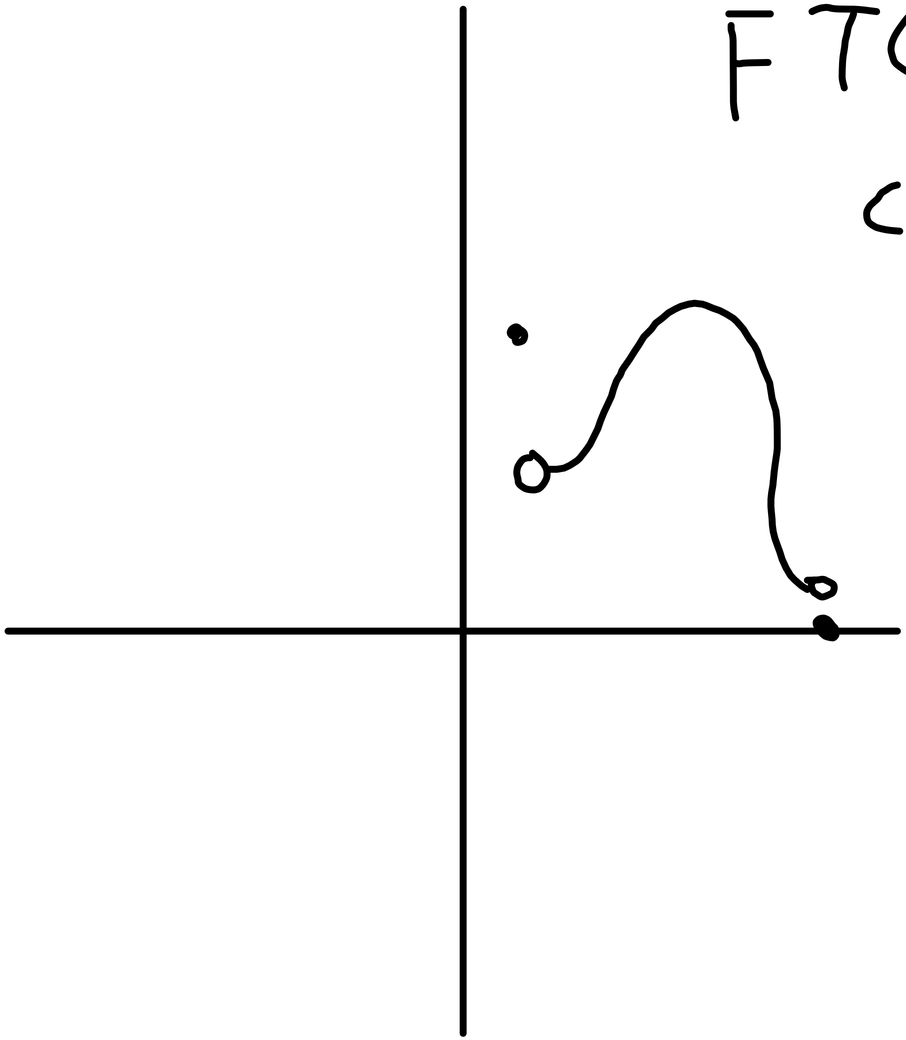
$$\frac{du}{dx} = -\sin x$$

$$\frac{d}{dx}\int_0^{\cos x}\sqrt{t^2-7}\,dt =$$

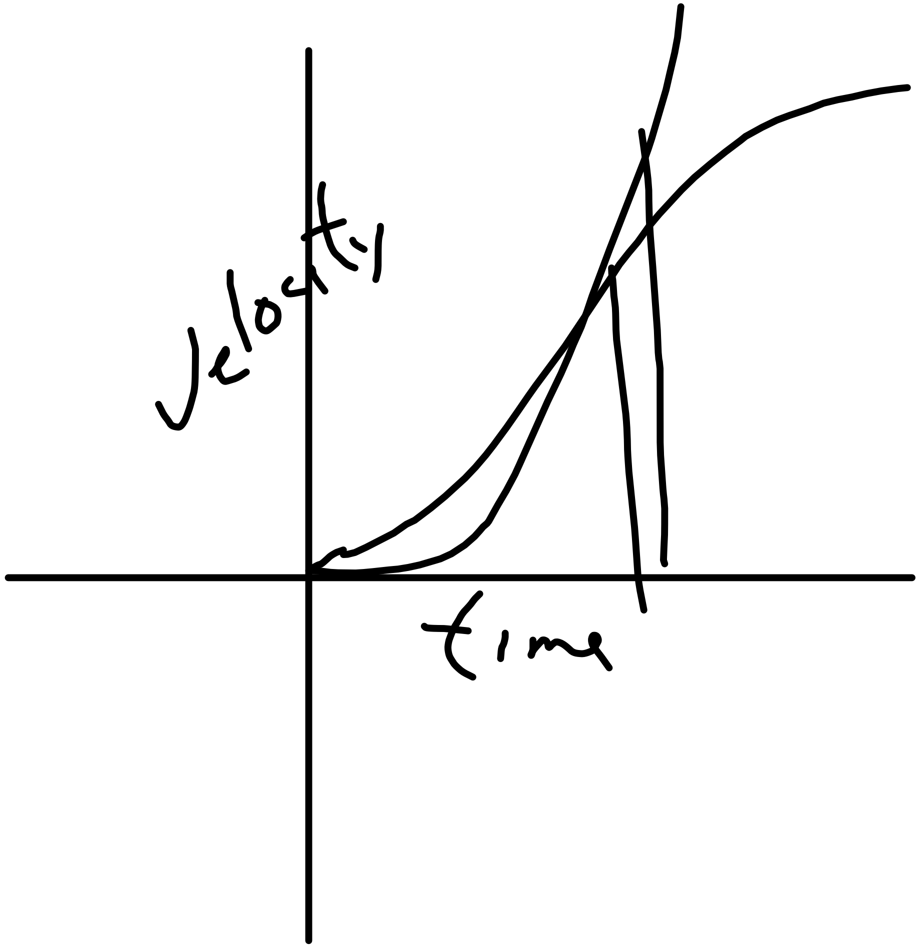
$$\frac{d}{dx}\left(\int_0^{u}\sqrt{t^2-7}\,dt\right) = \sqrt{u^2-7}\ \frac{du}{dx}$$

$$= \sqrt{\cos^2 x-7}\cdot(-\sin x)$$

$$= -\sin x\sqrt{\cos^2 x-7}$$



FTC requires continuity on the closed interval defined by the bounds of integration


velocity
time