Good afternoon: do these 4 AP no calculator multiple choice problems

$$\int_0^{\frac{\pi}{4}} \sin x \, dx =$$

(A) $-\frac{\sqrt{2}}{2}$ (B) $\frac{\sqrt{2}}{2}$ (C) $-\frac{\sqrt{2}}{2} - 1$ (D) $-\frac{\sqrt{2}}{2} + 1$ (E) $\frac{\sqrt{2}}{2} - 1$

$$\int x^2 \cos\left(x^3\right) dx =$$

(A) $-\frac{1}{3}\sin\left(x^3\right) + C$

(B) $\frac{1}{3}\sin\left(x^3\right) + C$

(C) $-\frac{x^3}{3}\sin\left(x^3\right) + C$

(D) $\frac{x^3}{3}\sin\left(x^3\right) + C$

(E) $\frac{x^3}{3}\sin\left(\frac{x^4}{4}\right) + C$

If $f(x) = \ln\left(x + 4 + e^{-3x}\right)$, then $f'(0)$ is

(A) $-\frac{2}{5}$ (B) $\frac{1}{5}$ (C) $\frac{1}{4}$ (D) $\frac{2}{5}$ (E) nonexistent

$$\frac{d}{dx}\left(\int_0^{x^2} \sin\left(t^3\right) dt\right) =$$

(A) $-\cos\left(x^6\right)$ (B) $\sin\left(x^3\right)$ (C) $\sin\left(x^6\right)$ (D) $2x\sin\left(x^3\right)$ (E) $2x\sin\left(x^6\right)$

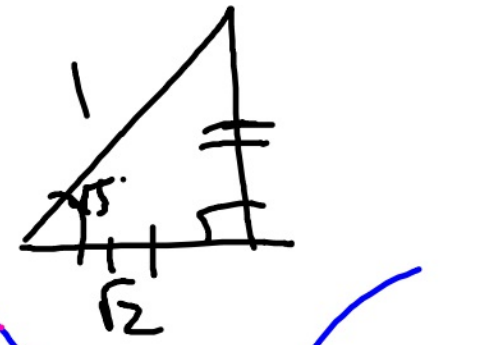
$\int_0^{\frac{\pi}{4}} \sin x \, dx =$

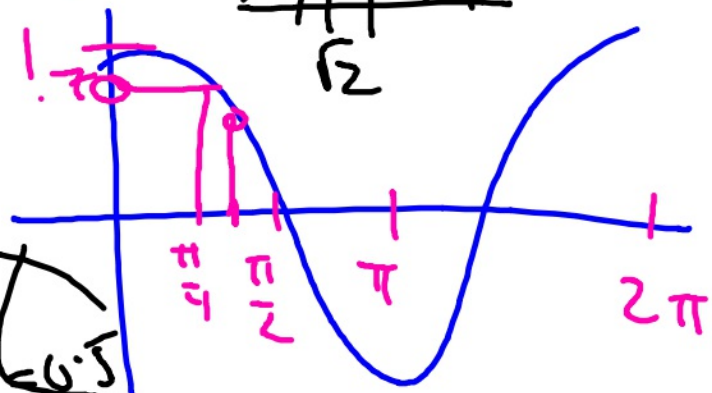
(A) $-\frac{\sqrt{2}}{2}$ (B) $\frac{\sqrt{2}}{2}$ (C) $-\frac{\sqrt{2}}{2} - 1$ (D) $-\frac{\sqrt{2}}{2} + 1$ (E) $\frac{\sqrt{2}}{2} - 1$

$$\left[-\cos x \right]_0^{\pi/4}$$

$$\left(-\cos\frac{\pi}{4} \right) - \left(-\cos 0 \right)$$

$$-\frac{\sqrt{2}}{2} + 1$$





$\frac{1}{2} = 0.5$

$\frac{\sqrt{3}}{2} \simeq 0.86$

$\frac{\sqrt{2}}{2} \simeq .7$

$$\int x^2 \cos\left(x^3\right) dx =$$

(A) $-\frac{1}{3}\sin\left(x^3\right) + C$

(B) $\frac{1}{3}\sin\left(x^3\right) + C$

(C) $-\frac{x^3}{3}\sin\left(x^3\right) + C$

(D) $\frac{x^3}{3}\sin\left(x^3\right) + C$

(E) $\frac{x^3}{3}\sin\left(\frac{x^4}{4}\right) + C$

$$\frac{1}{3}\int \cancel{3x^2} \cdot \cos\left(x^3\right) dx$$

what: $3x^2$

$$\frac{1}{3}\left[\sin\left(x^3\right) + C\right]$$

If $f(x) = \ln\left(x + 4 + e^{-3x}\right)$, then $f'(0)$ is

(A) $-\frac{2}{5}$ (B) $\frac{1}{5}$ (C) $\frac{1}{4}$ (D) $\frac{2}{5}$ (E) nonexistent

$$f' = \frac{1}{x + 4 + e^{-3x}} \cdot \left(1 + 0 + e^{-3x} \cdot -3\right)$$

@ $x = 0$

$$\frac{1}{4 + e^{0}} \cdot \left(1 - 3e^{0}\right)$$

$$\frac{1}{5} \cdot -2$$

$$\frac{d}{dx} e^{f(x)} = e^{f(x)} \cdot f'(x)$$

$3^3 = 27$

$3^2 = 9$

$3^1 = 3$

$3^0 = 1$

$3^{-1} = \frac{1}{3}$

$$\frac{d}{dx}\left(\int_0^{x^2} \sin\left(t^3\right) dt\right) =$$

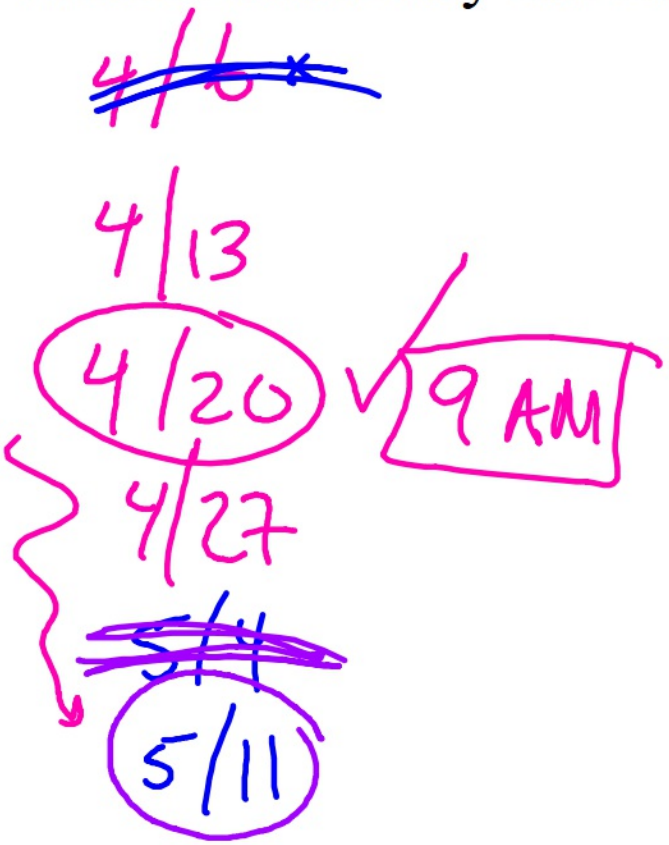
(A) $-\cos\left(x^6\right)$ (B) $\sin\left(x^3\right)$ (C) $\sin\left(x^6\right)$ (D) $2x\sin\left(x^3\right)$ (E) $2x\sin\left(x^6\right)$

$\sin\left(\left(x^2\right)^3\right) \cdot 2x$

$2x \cdot \sin\left(x^6\right)$

HW questions?

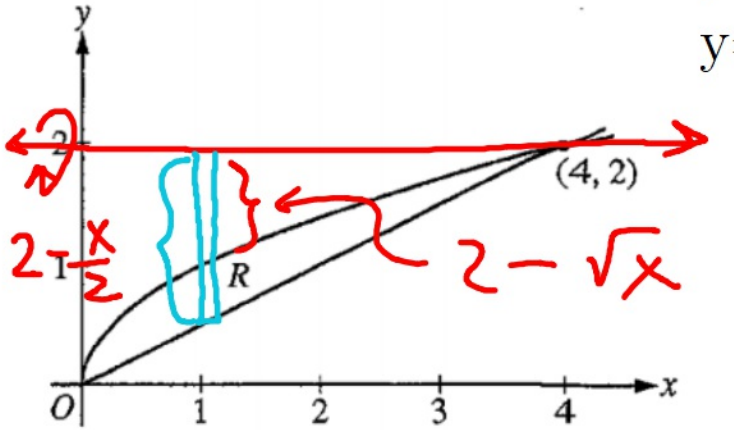
Which Saturday for AP test?



More with volume:

y=sqrt(x)

y=x/2



$2 - \frac{x}{2}$

$2 - \sqrt{x}$

① $\int_0^4 x^{1/2} - \frac{1}{2}x \, dx$

$\left[\frac{2}{3}x^{3/2} - \frac{1}{4}x^2\right]_0^4$

$\left(\frac{16}{3} - \frac{12}{3}\right) - (0)$

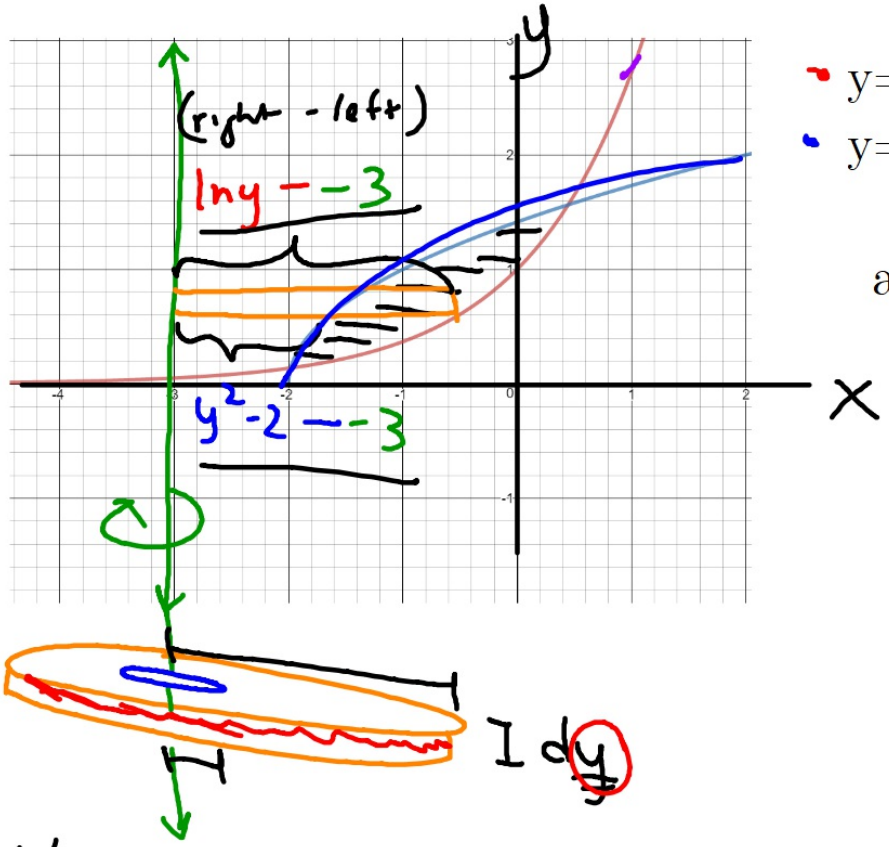
$\frac{4}{3}$

(1) Find area of R (no calc) $\left(\frac{4}{3}\right)$

(2) Revolve R around y=2 (calc) $\left(\frac{8}{3}\pi\right)$

② $V = \pi \int_0^4 \left(2 - \frac{x}{2}\right)^2 - \left(2 - \sqrt{x}\right)^2 dx$

Vertical axis revolutions



- y=e^x
- y=sqrt(x+2)

(-1.961, 0.138)
(0.448, 1.564)

about x=-3

$\ln y = e^x$

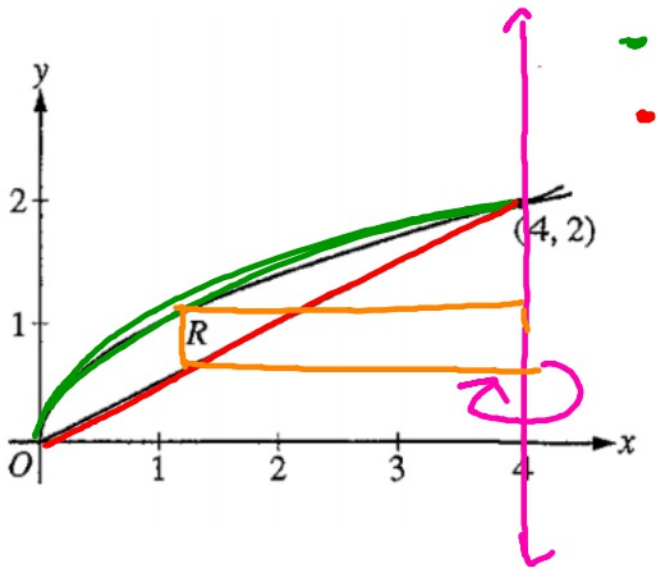
$\ln y = x$

$y = \sqrt{x+2}$

$y^2 = x+2 \rightarrow y^2 - 2 = x$

$$V = \pi(\ln y + 3)^2\,dy - \pi(y^2+1)^2\,dy$$

$$V = \pi\int_{0.138}^{1.564}((\ln y+3)^2 - (y^2+1)^2\,dy$$



- y=sqrt(x)
- y=x/2
  - $y^2 = x$
  - $2y = x$

Revolve R about x=4

$$V = \pi \int_0^2 \left(4 - y^2\right)^2 - \left(4 - 2y\right)^2 dy$$

Volume by cross section