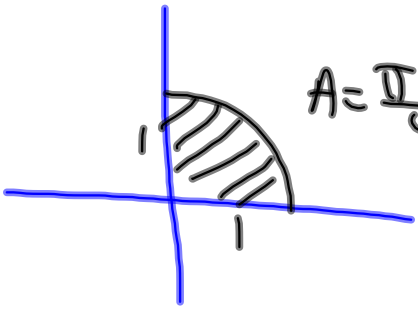
HW:page 382 #4

page 389 #3,5,7,17,19,21,29,39b,43

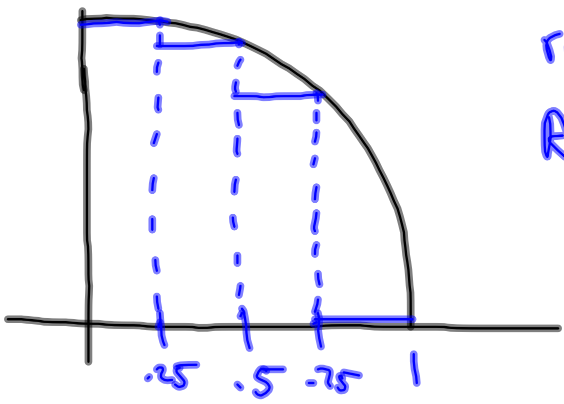
#4) $y=\sqrt{1-x^2}$ [0,1]

$y^2=1-x^2$

$x^2+y^2=1$



$A=\frac{\pi r^2}{4}=\frac{\pi}{4}$



right end pts $\qquad y = \sqrt{1-x^2}$

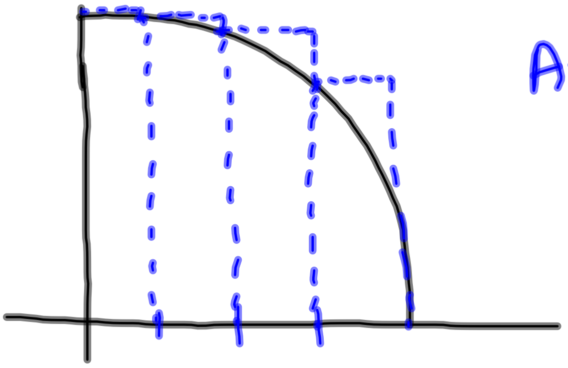
$$A = \sqrt{1-\frac{1}{16}}\left(\frac{1}{4}\right) + \sqrt{1-\frac{1}{4}}\left(\frac{1}{4}\right) + \sqrt{1-\frac{9}{16}}\left(\frac{1}{4}\right) + 0$$

$$= \sqrt{\frac{15}{16}}\left(\frac{1}{4}\right) + \sqrt{\frac{3}{4}}\left(\frac{1}{4}\right) + \sqrt{\frac{7}{16}}\left(\frac{1}{4}\right)$$

$$= 0.6239$$

$$\pi/4 = .7854$$

<u>left endpoints</u> $y=\sqrt{1-x^2}$ $h=\frac{1}{4}$



$$A \approx 1\cdot\frac{1}{4}+\sqrt{1-\frac{1}{16}}\left(\frac{1}{4}\right)+\sqrt{1-\frac{1}{4}}\left(\frac{1}{4}\right)$$
$$+\sqrt{1-\cancel{9}/16}\left(\frac{1}{4}\right)$$
$$=\frac{1}{4}+\sqrt{\frac{15}{16}}\left(\frac{1}{4}\right)+\sqrt{\frac{3}{4}}\left(\frac{1}{4}\right)+\sqrt{\frac{7}{16}}\left(\frac{1}{4}\right)$$
$$=.8739$$

$(l+r)\div 2=.7489$

$\frac{\pi}{4}=.7854$ ☺

p389 #3

$$\frac{d\left(\sqrt{x^3+5}\right)}{dx} = \frac{1}{2}(x^3+5)^{-\frac{1}{2}}3x^2 = \frac{3x^2}{2\sqrt{x^3+5}}$$

$$\int \frac{3}{2}\frac{x^2}{\sqrt{x^3+5}}dx = \sqrt{x^3+5} + C$$

5) $$\frac{d\left(\sin(2\sqrt{x})\right)}{dx} = \cos(2\sqrt{x})\cdot 2\left(\frac{1}{2}\right)\frac{1}{\sqrt{x}} = \frac{1}{\sqrt{x}}\cos(2\sqrt{x})$$

$$\int \frac{\cos 2\sqrt{x}}{\sqrt{x}}dx = \sin(2\sqrt{x}) + C$$

7) $\int x^8 dx = \frac{x^9}{9} + C$ $\quad \int x^{\frac{5}{7}} dx = \frac{7x^{12/7}}{12} + C$

$$\int x^3\sqrt{x}\,dx = \int x^{7/2} dx = \frac{2x^{9/2}}{9} + C$$

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17) $\int \frac{x^5+2x^2-1}{x^4} dx = \int \left(x + \frac{2}{x^2} - \frac{1}{x^4}\right) dx$

$$= \int x\,dx + 2\int x^{-2} dx - \int x^{-4} dx$$

$$= \frac{x^2}{2} + 2\left(\frac{x^{-1}}{-1}\right) - \left(\frac{x^{-3}}{-3}\right) + C$$

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

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

$$\frac{dy}{dx} = 2\frac{x}{2} - 2\left(-1x^{-2}\right) + \frac{1}{3}\left(-3x^{-4}\right) + 0$$

$$= x + \frac{2}{x^2} - \frac{1}{x^4}$$

$$= \frac{x^4}{x^4}x + \frac{x^2}{x^2}\frac{2}{x^2} - \frac{1}{x^4} = \frac{x^5 + 2x^2 - 1}{x^4}$$

19) $\int \left[\frac{2}{x} + 3e^x\right] dx = \int \frac{2}{x} dx + \int 3e^x dx$

$2\int \frac{1}{x} dx + 3\int e^x dx = 2\ln x + 3e^x + C$

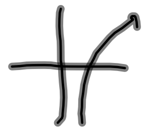
21) $\int (4\sin x + 2\cos x) dx = 4\int \sin x \, dx + 2\int \cos x \, dx$

$= 4(-\cos x) + 2(\sin x) + C$

29) $\int [1+\sin^2\theta \csc\theta]\, d\theta = \int \left[1+\sin^2\theta \frac{1}{\sin\theta}\right] d\theta$

$\int (1+\sin\theta)\, d\theta = \int d\theta + \int \sin\theta\, d\theta$

$= \theta - \cos\theta + C$



39b) $\frac{dy}{dt} = \frac{1}{t}$ $\quad y(-1)=5$

$dy = \frac{1}{t}\, dt$

$\int dy = \int \frac{1}{t}\, dt$

$y = \ln|t| + C$

$5 = \ln|(-1)| + C$

$5 = \ln 1 + C$

$5 = C$

$y = \ln|t| + 5$

43) $m_{tan} = 2x+1$ $(-3, 0)$

$$\frac{dy}{dx} = 2x+1$$

$$dy = (2x+1)\,dx$$

$$\int dy = \int (2x+1)\,dx$$

$$y = x^2 + x + C$$

$$0 = (-3)^2 + (-3) + C$$

$$0 = 9 - 3 + C$$

$$C = -6$$

$$y = x^2 + x - 6$$