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P. 488 #3,7

3) $y = 3x^{3/2} - 1 \quad [0,1] \qquad y' = \frac{9}{2}x^{\frac{1}{2}}$

$(y')^2 = \frac{81}{4}x$

$$\int_0^1 \sqrt{1 + \frac{81}{4}x}\,dx$$

$$\frac{4}{81}\int_0^1 \sqrt{1 + \frac{81}{4}x}\,\frac{81}{4}dx$$

$$\frac{4}{81}\frac{\left(1+\frac{81}{4}x\right)^{\frac{3}{2}}}{\frac{3}{2}}\Bigg|_0^1 = \frac{8}{243}\left(\left(\frac{85}{4}\right)^{\frac{3}{2}} - 1\right) = \frac{85^{3/2} - 8}{243}$$

$\frac{85\sqrt{85}-8}{243}$

4) $x = \frac{1}{3}(y^2+2)^{3/2}$ $\quad y=0, y=1$

$x' = \frac{1}{2}(y^2+2)^{1/2}(2y)$

$(x')^2 = (y^2+2)y^2 = y^4+2y^2$

$$\int_0^1 \sqrt{1+2y^2+y^4}\,dy$$

$$\int_0^1 \sqrt{(1+y^2)^2}\,dy$$

$$\int_0^1 (1+y^2)\,dy = y+\frac{y^3}{3}\Big|_0^1 = \frac{4}{3}$$

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

$y' = \frac{1}{2}(4-x^2)^{-\frac{1}{2}}(-2x)$

$SA = \int_{-1}^{1} 2\pi\sqrt{4-x^2}\sqrt{1 + x^2\frac{1}{4-x^2}}\,dx$

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

$\sqrt{4-x^2}\sqrt{\frac{4}{4-x^2}}$

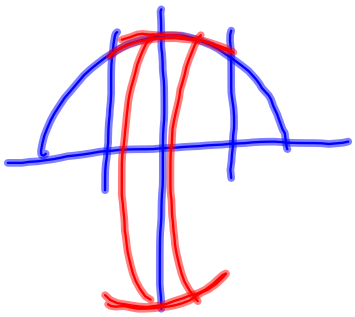
$= \int_{-1}^{1} 2\pi \cdot 2\,dx$

$4\pi x\Big|_{-1}^{1} = 4\pi - (-4\pi) = 8\pi$

$y = \sqrt{4-x^2}$

$y^2 = 4 - x^2$

$x^2 + y^2 = 4$



7) $x = \sqrt{9 - y^2} \quad -2 \le y \le 2$

$x' = \frac{1}{2}(9-y^2)^{-\frac{1}{2}}(-2y)$

$(x')^2 = \frac{y^2}{9-y^2}$

$$SA = \int_{-2}^{2} 2\pi \sqrt{9-y^2}\sqrt{1+\frac{y^2}{9-y^2}}\,dy = 2\pi\int_{-2}^{2} \sqrt{9}\,dy = 6\pi y\Big|_{-2}^{2}$$

$\frac{9-y^2}{9-y^2} + \frac{y^2}{9-y^2}$

$= 12\pi - (-12\pi)$

$= 24\pi$