#26(c) cont'd:

$$\text{surf. area} = 2\pi \int_0^4 \sqrt{y}\,\sqrt{1+\frac{1}{4y}}\,dy + 2\pi \int_4^6 \sqrt{12-2y}\,\sqrt{1+\frac{1}{12-2y}}\,dy$$

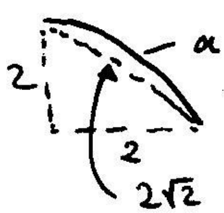
$$= 2\pi \left(\int_0^4 \sqrt{y+\tfrac{1}{4}}\,dy + \int_4^6 \sqrt{13-2y}\,dy \right)$$

$$= 2\pi \left(\left[\frac{2}{3}\left(y+\frac{1}{4}\right)^{3/2}\right]_0^4 + \left[-\frac{1}{2}\cdot\frac{2}{3}\left(13-2y\right)^{3/2}\right]_4^6 \right) =$$

$$= 2\pi\,\frac{2}{3}\,\frac{17^{3/2}-1}{8} - 2\pi\cdot\frac{1}{3}\left(1-5^{3/2}\right)$$

$$= \frac{2\pi}{3}\left(\frac{17\sqrt{17}}{4} - \frac{5}{4} + 5\sqrt{5}\right) \approx 57.4986$$

Rough estimate to check plausibility of above calculation:



a bit more than $2\sqrt{2}$, let's say ≈ 3

lower part curve:

a bit more than $\sqrt{20}$, let's say ≈ 5

A curve of length ≈ 8 rotates

"average radius" approximately 1 (prbly a bit more)

Expect rough estimate of surface area as $2\pi\cdot 1\cdot 8 \approx 16\pi \approx 50$

(No technology used for this rough estimate!)