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$\int_{0}^{2 \pi}|\sin (\mathrm{x})| \mathrm{dx}$

1) $\sin (x)$ is already positive between 0 and $\pi$, so drop the bars, and integrate.

$$
\int_{0}^{\pi} \sin (x) d x=-\cos (x) \left\lvert\, \begin{aligned}
& \pi \\
& 0
\end{aligned}=-\cos (\pi)-(-\cos (0))=-(-1)+(1)=1+1=2\right.
$$


2) Between $\pi$ and $2 \pi, \sin (x)$ is negative, so drop the bars, and multiply by -1 .

This has the effect of taking the absolute value of $\sin (x)$, as shown below. Now we integrate. As you can see, the second bulge is flipped up.

3) Now you can add the two, so the final result is 4 .

