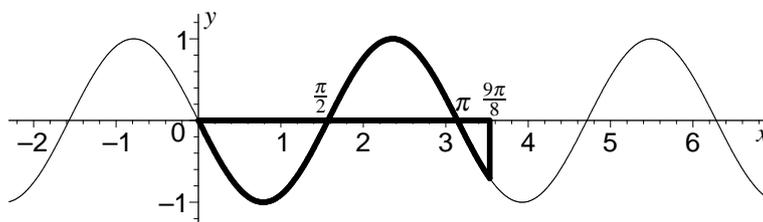


### Aufgabe 13.70

Ermitteln Sie den Inhalt der von  $y = \sin(2x + \pi)$ , der  $x$ -Achse zwischen  $0$  und  $\frac{9}{8}\pi$  sowie  $x = \frac{9}{8}\pi$  begrenzten Fläche!

**Lösung:**



$$\begin{aligned} A &= \int_0^{\frac{9\pi}{8}} |\sin(2x + \pi)| \, dx = -\int_0^{\frac{\pi}{2}} \sin(2x + \pi) \, dx + \int_{\frac{\pi}{2}}^{\pi} \sin(2x + \pi) \, dx - \int_{\pi}^{\frac{9\pi}{8}} \sin(2x + \pi) \, dx \\ &= \frac{1}{2} [\cos(2x + \pi)]_0^{\frac{\pi}{2}} - \frac{1}{2} [\cos(2x + \pi)]_{\frac{\pi}{2}}^{\pi} + \frac{1}{2} [\cos(2x + \pi)]_{\pi}^{\frac{9\pi}{8}} \\ &= \frac{1}{2} \left( \cos 2\pi - \cos \pi - \cos 3\pi + \cos 2\pi + \cos \frac{13\pi}{4} - \cos 3\pi \right) \\ &= \frac{1}{2} \left( 1 - (-1) - (-1) + 1 + \left(-\frac{1}{\sqrt{2}}\right) - (-1) \right) = \frac{5\sqrt{2} - 1}{2\sqrt{2}} \approx \underline{\underline{2.14645}} \end{aligned}$$