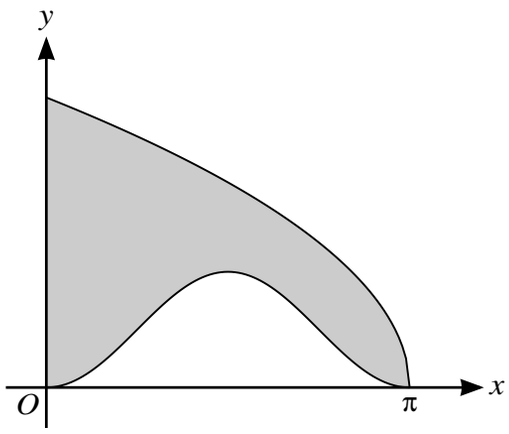

The diagram shows the curves $y = \sqrt{2\pi - 2x}$ and $y = \sin^2 x$ for $0 \leqslant x \leqslant \pi$. The shaded region is bounded by the two curves and the line $x = 0$.

Find the exact area of the shaded region. [8]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....