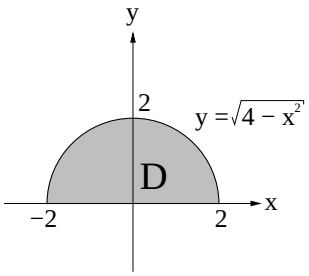
Multiple Integration
Double Integrals

Question
Evaluate the following double integral by inspection.
$\int\int_D (x+3)\,dA$,
where D is the half-disk $o \leq y \leq \sqrt{4-x^2}$.
Answer

$$\begin{aligned}\int\int_D (x+3\,dA &= \int\int_D x\,dA + 3\int\int_D\,dA \\ &= 0 + 3(\text{area of } D) \\ &= 3 \times \tfrac{\pi 2^2}{2} = 6\pi\end{aligned}$$



The integral of x over D equals zero because D is symmetrical about $x = 0$.