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Evaluate $\displaystyle\int_0^{2\pi} (x-4)\sin(x)\, dx$

HINT:

Use integration by parts:

$$\int f(x)g(x)\, dx = F(x)g(x) - \int F(x)g'(x)\, dx + C, \text{ such that } F(x) = \int f(x)\, dx$$

Take $f(x) = \sin(x)$ and $g(x) = x-4$

Choosing $g(x) = x-4$ reduces the degree to 0 after $g'(x)$ which prevents the repetitive use of integration by parts.

Additional note:

LIATE

An acronym that is very helpful to remember when using integration by parts is **LIATE**. Whichever function **comes first** in the following list should be $g(x)$:

L	Logarithmic functions	$\ln(x), \log_{10}(x)$
I	Inverse trig. functions	$\arccos(x), \arctan(x)$
A	Algebraic functions	$x, x^3, 5x^2$
T	Trigonometric functions	$\sin(x), \cos(x)$
E	Exponential Functions	$e^x, 2^x$