Example 3-4: Consider taking the derivative of a DC-offset sine wave $x(t) = 7 + 6\sin(250\pi t)$. The spectrum set for $x(t)$ is $\mathcal{S} = \{(0, 7), (125, -3j), (-125, 3j)\}$. In the spectrum of $\frac{d}{dt}x(t)$, the $f = 0$ term is 7 multiplied by $(j2\pi(0)) = 0$, so it is eliminated; the $f = +125$-Hz term is multiplied by $(j2\pi(125))$

$$(j2\pi(125))(-3j) = 750\pi$$

Thus the spectrum set of $\frac{d}{dt}x(t)$ is $\mathcal{S} = \{(125, 750\pi), (-125, 750\pi)\}$. From the spectrum it should be easy to verify that

$$\frac{d}{dt}x(t) = 1500\pi\cos(250\pi t)$$

which coincides with the fact that the derivative of a sine function is a cosine and the derivative of a constant is zero.