Exercises

E23.30 [1SF] Let $f : \mathbb{R} \to \mathbb{C}$ be a C^n class function , let $\theta \in \mathbb{C}$ be a constant, and let $g(x) = e^{\theta x} f(x)$. Show that, if p is a polynomial and $q(x) = p(x + \theta)$, then

$$p(D)g = e^{\theta x}[q(D)f] \quad .$$

Note that we can also write the relation above as a ”conjugation”

$$e^{-\theta x}\big[p(D)[e^{\theta x} f]\big] = p(D + \theta)f \ .$$

Solution 1. [1SG]