8.5.b. $g(x) = \dfrac{f(x + f(x)) - f(x)}{f(x)}$

For $f(x) = x \cdot e^x - 1$, $g(x)$ blows up for a large first guess $x^{(0)}$

$\Rightarrow$ Modify function f s.t. $x^{(0)}$ can be large

$\Rightarrow$ If $h: [a,b] \to \mathbb{R}$, $h(x) \neq 0 \ \forall x \in [a,b]$, then $(fh)(x) = 0 \Leftrightarrow f(x) = 0$.

$\Rightarrow$ Modify f s.t. the problematic e^x gets removed (responsible for the blow-up)

$\Rightarrow$ Choose $h(x) = e^{(-x)}$

$\Rightarrow$ $(hf)(x) = x - e^{(-x)}$ (e^x is removed and $(hf)(x)$ does not blow up)

$\Leftrightarrow$ $(hf)(x) = 0 \Leftrightarrow f(x) = 0$

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8.5
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