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2)

$$0 = \langle ae^{-t} + be^{-2t}, e^{-t} \rangle = \int_0^\infty (ae^{-2t} + be^{-3t})dt$$

$$= \frac{a}{2} + \frac{b}{3}$$

orthogonality

So you can take $a = 2$, $b = -3$ to get zero.

Any nonzero multiple of $\boxed{2e^{-t} - 3e^{-2t}}$ also works.