spectrum of $A - \mu I$

Let A be an endomorphism of the vector space V over a field k. Denote by $\sigma(A)$ the spectrum of A. Then we have:

Theorem 1.
$$\sigma(A - \mu I) = \{\lambda - \mu \colon \lambda \in \sigma(A)\}$$

Theorem **??** is equivalent to:

Theorem 2. *λ is a spectral value of A if and only if $\lambda - \mu$ is a spectral value of $A - \mu I$.*

Proof of Theorem **??**. Note that

$$A - \lambda I = (A - \mu I) - (\lambda I - \mu I) = (A - \mu I) - (\lambda - \mu)I$$

and thus $A - \lambda I$ is invertible if and only if $(A - \mu I) - (\lambda - \mu)I$ is invertible. Equivalently, λ is a spectral value of A iff $\lambda - \mu$ is a spectral value of $(A - \mu I)$, as desired. $\square$