Step-1

If A is positive definite then,

$\Rightarrow x^T Ax > 0$ for any $x \neq 0$ â€¦â€¦ (1)

If B is positive definite then,

$\Rightarrow x^T Bx > 0$ for any $x \neq 0$ â€¦â€¦ (2)

Step-2

Now for $x \neq 0$,

$$\begin{aligned} x^T (A+B)x &= x^T Ax + x^T Bx \\ &> 0 \qquad \left(\text{using (1) and (2)}\right) \end{aligned}$$

Thus $x^T (A+B)x > 0$ for $x \neq 0$.

Therefore, $A+B$ $\boxed{\text{is also positive definite}}$.