Step-1

Let $A = S\Lambda S^{-1}$. Then to determine eigen value matrix for $A+2I$, and eigen vector matrix. Also, fill in the following blanks:

$$A+2I = (\ )(\ )(\ )^{-1}$$

Step-2

To find the eigen value matrix do the following calculations:

$$A = S\Lambda S^{-1}$$
$$\Lambda = S^{-1}AS$$

Now, for $A+2I$ the eigen value matrix will be as follows:

$$\begin{aligned} S^{-1}(A+2I)S &= \left(S^{-1}A+2S^{-1}I\right)S \\ &= S^{-1}AS+2S^{-1}S \\ &= \Lambda+2I \end{aligned}$$

Therefore, eigen value matrix for $A+2I$ is: $\boxed{\Lambda+2I}$, and eigen vector matrix will be S

Also, $A+2I$ can be written as follows:

$$\boxed{A+2I = (S)(\Lambda+2I)(S)^{-1}}$$

If the above relation is checked by substituting all the values, it is found to be true.