

Question 2

Solve the following equation:

$$e^{2x} - 7e^x + 10 = 0$$

- (a) Solve algebraically for all real solutions.
- (b) Check each solution for validity.

Question 2 - Solution

(a) Let $y = e^x$. Then the equation becomes:

$$y^2 - 7y + 10 = 0 \Rightarrow (y - 5)(y - 2) = 0 \Rightarrow y = 5 \quad \text{or} \quad y = 2$$

Now solve for x :

$$e^x = 5 \Rightarrow x = \ln(5)$$

$$e^x = 2 \Rightarrow x = \ln(2)$$

(b) **Check domain/validity:**

Both $\ln(2)$ and $\ln(5)$ are defined for positive inputs, and since both values came from valid solutions for $y = e^x > 0$, no extraneous solutions.

Final Answer:

$x = \ln(2) \quad \text{or} \quad x = \ln(5)$
