

Calculus I

Type 4: Exponent equation that reduces to quadratic

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Example

Solve the equation

$$e^{2x} - 3e^x - 4 = 0$$

Set $e^x = u$. Then $e^{2x} = u^2$.

$$u^2 - 3u - 4 = 0$$

$$(u - 4)(u + 1) = 0$$

$$u = 4$$

or

$$u = -1$$

$$e^x = 4$$

or

$$e^x = -1$$

$$x = \ln 4$$

or

no real solution

$$x \approx 1.3863$$