

Precalculus

Basic exponent equation of type $e^{px+q} = A$

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Example

Solve the equation.

$$e^{5-3x} = 10$$

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$$\begin{array}{rcl} e^{5-3x} & = & 10 \\ \ln(e^{5-3x}) & = & \ln 10 \end{array} \quad \text{apply } \ln$$

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$$\begin{aligned} e^{5-3x} &= 10 && \text{apply } \ln \\ \ln(e^{5-3x}) &= \ln 10 \\ 5 - 3x &= \ln 10 \end{aligned}$$

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$$\begin{aligned} e^{5-3x} &= 10 && \text{apply } \ln \\ \ln(e^{5-3x}) &= \ln 10 \\ \textcolor{red}{5} - 3x &= \ln 10 \\ 3x &= \textcolor{red}{5} - \ln 10 \end{aligned}$$

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 \textcolor{red}{3}x & = & 5 - \ln 10 & & \\
 x & = & \frac{5 - \ln 10}{\textcolor{red}{3}} & &
 \end{array}$$

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 \ln(e^{5-3x}) &= \ln 10 \\
 5 - 3x &= \ln 10 \\
 3x &= 5 - \ln 10 \\
 x &= \frac{5 - \ln 10}{3} \\
 \text{Calculator: } x &\approx 0.8991.
 \end{aligned}$$

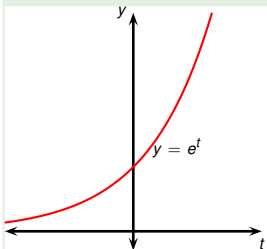
Example

$$e^{2x+3} = -1$$

Example

$$e^{3x-1} = 0$$

Example



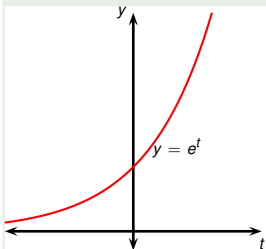
$$e^{2x+3} = -1$$

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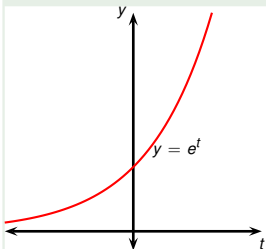
no real solution

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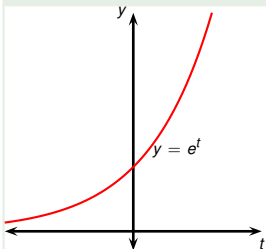
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- Exponents of complex numbers can be negative (google Euler’s f-la).

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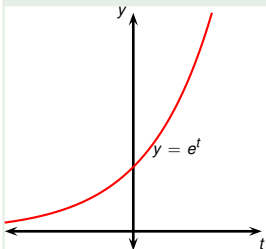
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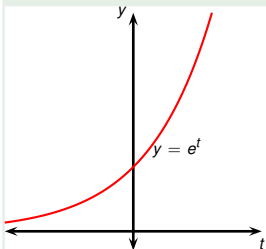
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$$e^{3x-1} = 0$$

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