Precalculus

Basic exponent equation of type $e^{px+q} = Ae^{rx+s}$

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Solve the equation.

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

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$$\begin{aligned} e^{x-3} &= 2e^{2x-1} \qquad \left| \text{ Divide by } e^{2x-1} \right. \\ \frac{e^{x-3}}{e^{2x-1}} &= 2 \\ e^{x-3-(2x-1)} &= 2 \end{aligned}$$

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\begin{aligned}
e^{x-3} &= 2e^{2x-1} && \text{Divide by } e^{2x-1} \\
\frac{e^{x-3}}{e^{2x-1}} &= 2 \\
e^{x-3-(2x-1)} &= 2 \\
e^{-x-2} &= 2 && \text{Apply } \ln \\
-x-2 &= \ln 2
\end{aligned}
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$$-x = \ln 2 + 2$$

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\frac{e^{x-3}}{e^{2x-1}} &= 2 \\
e^{x-3-(2x-1)} &= 2 \\
e^{-x-2} &= 2 && \left| \text{ Apply } \ln \right. \\
-x-2 &= \ln 2 \\
-x &= \ln 2 + 2 \\
x &= -(\ln 2 + 2)
\end{aligned}
$$

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Solve the equation.

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-x-2 &= \ln 2 \\
-x &= \ln 2 + 2 \\
x &= -(\ln 2 + 2) \\
x &= -\ln 2 - 2 && \text{Final answer}
\end{aligned}
$$

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Solve the equation.

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\begin{aligned}
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\frac{e^{x-3}}{e^{2x-1}} &= 2 \\
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e^{-x-2} &= 2 && \text{Apply } \ln \\
-x-2 &= \ln 2 \\
-x &= \ln 2 + 2 \\
x &= -(\ln 2 + 2) \\
x &= -\ln 2 - 2 && \text{Final answer} \\
x &\approx -2.693 && \text{Calculator}
\end{aligned}
$$