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

Todor Milev

2019

Example

Solve the equation.

$$2^{1-5x} = 12$$

Example

Solve the equation.

$$\begin{aligned} 2^{1-5x} &= 12 \quad \Big| \text{ apply } \log_2 \\ \log_2(2^{1-5x}) &= \log_2 12 \end{aligned}$$

Example

Solve the equation.

$$\begin{aligned} 2^{1-5x} &= 12 && \mid \text{apply } \log_2 \\ \log_2(2^{1-5x}) &= \log_2 12 \\ 1-5x &= \log_2 12 \end{aligned}$$

Example

Solve the equation.

$$\begin{aligned} 2^{1-5x} &= 12 && \mid \text{apply } \log_2 \\ \log_2(2^{1-5x}) &= \log_2 12 \\ 1-5x &= \log_2 12 = \textbf{?} \end{aligned}$$

Example

Solve the equation.

$$\begin{aligned} 2^{1-5x} &= 12 && \mid \text{apply } \log_2 \\ \log_2(2^{1-5x}) &= \log_2 12 \\ 1-5x &= \log_2 12 = \log_2(4 \cdot 3) \end{aligned}$$

Example

Solve the equation.

$$
\begin{aligned}
2^{1-5x} &= 12 && \mid \text{apply } \log_2 \\
\log_2(2^{1-5x}) &= \log_2 12 \\
1-5x &= \log_2 12 = \log_2(4 \cdot 3) \\
1-5x &= \log_2 4 + \log_2 3
\end{aligned}
$$

Example

Solve the equation.

$$
\begin{aligned}
2^{1-5x} &= 12 && \mid \text{apply } \log_2 \\
\log_2(2^{1-5x}) &= \log_2 12 \\
1-5x &= \log_2 12 = \log_2(4 \cdot 3) \\
1-5x &= \log_2 4 + \log_2 3 \\
1-5x &= \textbf{?} + \log_2 3
\end{aligned}
$$

Example

Solve the equation.

$$
\begin{aligned}
2^{1-5x} &= 12 && \mid \text{apply } \log_2 \\
\log_2(2^{1-5x}) &= \log_2 12 \\
1-5x &= \log_2 12 = \log_2(4 \cdot 3) \\
1-5x &= \log_2 4 + \log_2 3 \\
1-5x &= 2 + \log_2 3
\end{aligned}
$$

Example

Solve the equation.

$$
\begin{aligned}
2^{1-5x} &= 12 && \mid \text{apply } \log_2 \\
\log_2(2^{1-5x}) &= \log_2 12 \\
1-5x &= \log_2 12 = \log_2(4\cdot 3) \\
1-5x &= \log_2 4 + \log_2 3 \\
1-5x &= 2 + \log_2 3 \\
5x &= 1-(2+\log_2 3)
\end{aligned}
$$

Example

Solve the equation.

$$
\begin{aligned}
2^{1-5x} &= 12 && \text{apply } \log_2 \\
\log_2(2^{1-5x}) &= \log_2 12 \\
1-5x &= \log_2 12 = \log_2(4\cdot 3) \\
1-5x &= \log_2 4 + \log_2 3 \\
1-5x &= 2+\log_2 3 \\
5x &= 1-(2+\log_2 3) \\
x &= \frac{-1}{\qquad\qquad}
\end{aligned}
$$

Example

Solve the equation.

$$
\begin{aligned}
2^{1-5x} &= 12 && \text{apply } \log_2 \\
\log_2(2^{1-5x}) &= \log_2 12 \\
1-5x &= \log_2 12 = \log_2(4\cdot 3) \\
1-5x &= \log_2 4 + \log_2 3 \\
1-5x &= 2+\log_2 3 \\
5x &= 1-(2+\log_2 3) \\
x &= \frac{-1-\log_2 3}{\qquad}
\end{aligned}
$$

Example

Solve the equation.

$$
\begin{aligned}
2^{1-5x} &= 12 && \text{apply } \log_2 \\
\log_2(2^{1-5x}) &= \log_2 12 \\
1-5x &= \log_2 12 = \log_2(4\cdot 3) \\
1-5x &= \log_2 4 + \log_2 3 \\
1-5x &= 2+\log_2 3 \\
5x &= 1-(2+\log_2 3) \\
x &= \frac{-1-\log_2 3}{5}
\end{aligned}
$$

Example

Solve the equation.

$$
\begin{aligned}
2^{1-5x} &= 12 && \text{apply } \log_2 \\
\log_2(2^{1-5x}) &= \log_2 12 \\
1-5x &= \log_2 12 = \log_2(4\cdot 3) \\
1-5x &= \log_2 4 + \log_2 3 \\
1-5x &= 2+\log_2 3 \\
5x &= 1-(2+\log_2 3) \\
x &= \frac{-1-\log_2 3}{5} \\
\text{Calculator: } x &\approx -0.516993.
\end{aligned}
$$