Bellwork

Use \( f(x) \) to determine the transformations to \( g(x) \). Then graph both equations. State the domain, range and asymptote of \( g(x) \).

\[
\begin{align*}
f(x) &= .2^x \\
g(x) &= .2^{x+1} + 3
\end{align*}
\]
Homework Answers

See Dukane
Unit 3
Exponential and Logarithmic Functions

Section 3.4:
Solving Equations

Objective: Students will be able to solve exponential and logarithmic equations.
Solving exponential equations by "taking the log of each side of the equation."

Round to 3 places.

\[ 3^x = 11 \]

\[
\begin{align*}
\log_3 3^x &= \log_3 11 \\
X \frac{\log 3}{\log 3} &= \frac{\log 11}{\log 3} \\
X &= \frac{\log 11}{\log 3} \\
x &= 2.183
\end{align*}
\]

\[ 16^x = 8 \]

\[
\begin{align*}
\log_{16} 16^x &= \log_8 8 \\
X \log_{16} 16 &= \log_8 8 \\
x &= \frac{\log_8 8}{\log_{16} 16} \\
x &= 0.75
\end{align*}
\]
Solving exponential equations by "change of base"

Round to 3 places.

\[ 3^x = 11 \]

\[ \log_3 11 = x \]

\[ \frac{\log 11}{\log 3} = x \]

\[ 16^x = 8 \]

\[ \log_{16} 8 = x \]

\[ \frac{\log 8}{\log 16} = x \]
Solve the exponential equation algebraically. Round your result to three decimal places.

$$6^{5x-2} = 15$$

$$\log_6 6^{5x-2} = \log_6 15$$

$$5x-2 \cdot \log_6 6 = \log_6 15$$

$$5x-2 = \frac{\log_6 15}{\log_6 6}$$

$$5x-2 = 1.511$$

$$5x = 3.511$$

$$x = 0.702$$
Solve the exponential equation algebraically. Round your result to three decimal places.

\[ 2\left(3^{2t-5}\right) - 4 = 11 \]

\[ \frac{2(3^{2t-5})}{2} = \frac{15}{2} \]

\[ 3^{2t-5} = 7.5 \]

\[ \log_3 3^{2t-5} = \log_3 7.5 \]

\[ 2t - 5 = \frac{\log 7.5}{\log 3} \]

\[ 2t - 5 = 1.834 \]

\[ 2t = 6.834 \]

\[ t = 3.417 \]
Solve the exponential equation algebraically. Round your result to three decimal places.

Method 1:
Take ln of each side

\[ e^x = 29 \]

\[ \ln(e^x) = \ln(29) \]

\[ x \ln(e) = \ln(29) \]

\[ x = \frac{\ln(29)}{\ln(e)} \]

\[ x = 3.367 \]

Method 2:
Change of base

\[ e^x = 29 \]

\[ \ln(e^{29}) = x \]

\[ \frac{\ln(29)}{\ln(e)} = x \]
Solve the exponential equation algebraically. Round your result to three decimal places.

\[
4e^{2x} = 5
\]

\[
\frac{4}{4} = \frac{5}{4}
\]

\[
e^{2x} = 1.25
\]

\[
\ln e^{2x} = \ln 1.25
\]

\[
2x \ln e = \ln 1.25
\]

\[
\frac{2x}{\ln e} = \frac{\ln 1.25}{\ln e}
\]

\[
2x = \frac{\ln 1.25}{\ln e}
\]

\[
2x = 0.223
\]

\[
x = 0.112
\]
Solve the exponential equation algebraically. Round your result to three decimal places.

\[ 5e^{2x} - 10 = -2 \]

\[ +10 +10 \]

\[ 5e^{2x} = 8 \]

\[ e^{2x} = \frac{8}{5} \]

\[ e^{2x} = 1.6 \]

\[ \ln e^{2x} = \ln 1.6 \]

\[ 2x \ln e = \ln 1.6 \]

\[ \frac{2x}{\ln e} = \frac{\ln 1.6}{\ln e} \]

\[ 2x = \frac{\ln 1.6}{\ln e} \]

\[ 2x = 0.47 \]

\[ x = 0.235 \]
Summary...

What should you do if the variable is in the exponent?
Homework

Worksheet 3.4 Day 1

1-19 odds!!!