```
    33. \(\log ^{3 x}=\log 4^{5 x+2}\)
    \(3 x \log 9=(5 x+2) \log 4\)
    \(3 \times \log 9=5 \times \log 4+2 \log 4\)
\(30 \log 9-58 \log 4=2 \log 4\)
\(x(3 \log 9-5 \log 4)=2 \log 4\)
    \(3 \log 9-5 \log 4\)
    \(x=\frac{2 \log 4}{3 \log 9-5 \log 4}\)
    \(x \approx-8,1595\)
```

39. There are currently 850 students at the high school. The district plans an addition that will hold 400 more students. If the school population grows at $7.8 \%$ per year, in how many years will the new addition be full?

$$
\begin{gathered}
y=a(1+r)^{t} \\
\frac{1250}{}=850(1+.078)^{t} \\
\ln \frac{1250}{850}=\ln 1.078^{t} \\
\frac{\ln \left(\frac{1250}{850}\right)}{\ln 1.078}=t \ln 1.078 \\
\frac{\ln \left(\frac{1250}{850}\right)}{\ln 1.078}=t \\
y r 3
\end{gathered}=t
$$

$$
\begin{aligned}
& \text { 34. } 2 e^{x}-1=11 \\
& 2 e^{x}=12 \\
& \text { on hex ind } \\
& x \text { 同会 } \\
& \underset{x}{x} \rightarrow \frac{x=\ln 6}{x \simeq} \\
& \text { 28. } 3 \log _{7} 3-\frac{1}{4} \log _{7} 81=\log _{7} x \\
& \log _{2} 3^{3}-{ }^{4} \log _{2} 81^{\frac{1}{4}}= \\
& \log _{2} \frac{27}{3}=\downarrow \\
& \log _{2} 9=\log _{7} x \\
& 9=x
\end{aligned}
$$

35. $\ln (x+3)=1$

$$
\begin{gathered}
e^{\ln (x+3)}=e^{1} \\
x+3=e \\
x=e-3 \\
x \approx
\end{gathered}
$$

30. $2 \log _{4} 6+\log _{4}(x \geq 1)=\log _{4} 252$

$$
\log _{4} 6^{2}
$$

$$
\begin{aligned}
2 \frac{\log _{6}}{\log _{4}}+\frac{\log _{10} 7}{\log _{4} 4} \log _{4}(36 x-36) & =\log _{4} 252 \\
=\frac{\log _{2} 252}{\log 4} 36 x-36 & =252 \\
x & =8
\end{aligned}
$$

41. A bone that originally contained 32,000 milligrams of Carbon-14 now contains 0.000000003 milligrams. How old is the fossil?

$$
\begin{gathered}
y=a e^{-.00012 t} \\
\frac{.000000003=32,000 e^{-.00012 t}}{32,000} \\
\ln \frac{.000000003}{32,000}=\ln e^{-.00012 t} \\
\ln \left(\frac{(000000003}{32,000}\right)=-.00012 t \\
-.00012 \\
y r s \approx t
\end{gathered}
$$

5. $(-1,6)$ and $(0,3)$

$$
\begin{array}{ll}
\begin{array}{l}
(-1,6) \text { and }(0,3) \\
x, y \\
6=3(b) \\
3
\end{array} & y=a(b) x \\
2=b^{-1}, ~ & y=3\left(\frac{1}{2}\right)^{x} \\
2=\frac{1}{b} \\
2 b=1
\end{array}, y
$$

37. $2 e^{3 x}+4=34$

$$
\begin{gathered}
2 e^{3 x}=30 \\
\text { lne } e^{3 x}=\ln 5 \\
3 x=\ln 15 \\
x=\frac{\ln 15}{3} \\
x \approx
\end{gathered}
$$

