## 4-3 Solving Exponential and Logarithmic equations

Objectives:
I can solve exponential and logarithmic equations both graphically and algebraically.

$$
\begin{gathered}
y^{2 x}=256_{\log _{4}} \\
\frac{2 x}{2 x}=\log _{4} 256 \\
\frac{2 x}{2}=\frac{4}{2} \\
x=2
\end{gathered}
$$

$$
\begin{gathered}
\log _{4} 4^{2 x} \operatorname{lng}_{4} 250 \\
2 x=\log _{4} 250 \\
\frac{2 x}{2}=\frac{3.98}{2} \\
x=1.99 \ldots
\end{gathered}
$$

$$
\begin{gathered}
\log _{a} e^{(x-1)} \text { 酶 } 5 \\
x-1=\ln 5 \\
+1 \\
x=1.6
\end{gathered}
$$

$$
\begin{aligned}
& \frac{10}{5}=\frac{5 e^{4 x}}{5} \\
& \ln 2=4 e^{4 x} \\
& \ln 2=4 x \\
& \frac{69}{4}=\frac{4 x}{4} \\
& x=17
\end{aligned}
$$

$$
\begin{array}{r}
5^{x-1}-4=7 \\
+4+4
\end{array}
$$




$$
\begin{gathered}
\ln x=4 \\
e^{4}=x \\
10 \cdot t=x
\end{gathered}
$$

$$
\begin{aligned}
& \frac{2 \ln (x+1)}{2}=\frac{4}{2} \\
& \ln (x+1)=2 \\
& e^{2}=x+1 \\
& -1 \quad-1 \\
& x=
\end{aligned}
$$

$$
\begin{gathered}
\log _{3}(2 x-4)=4 \\
3^{4}=2 x-4 \\
81=2 x-4 \\
+4 \\
\frac{85}{2}=\frac{2 x}{2} x=42.5 \\
6^{3 x}=12 \log _{i 2} x=.462
\end{gathered}
$$

## Solve the following

$$
\log (4 x)=2
$$

$4 \ln (x+7)-5=1$

Your house cost $\$ 250,000$ and appreciates
at a rate of $3 \%$ every year. How long will it take to reach $\$ 300,000$ ?

$$
\begin{aligned}
& \frac{250,000(1+.03)^{2}}{289,000}=\frac{300,000}{250,000} \\
& \log _{3}\left(\int_{3}, 03\right)^{x} \operatorname{tg}_{g_{103}} 1.2 \\
& x=6.16
\end{aligned}
$$

