$$
\begin{aligned}
& \text { 15. } 3^{x}=5^{x+4} \\
& \log 3^{x}=\log 5^{x+4} \\
& x \log 3=(x+4) \log 5 \\
& x \log 3=x \log 5+4 \log 5 \\
& x \log 3-x \log 5=4 \log 5 \\
& x(\log 3-\log 5)=4 \log 5 \\
& \quad x=\frac{4 \log 5}{\log 3-\log 5}=\frac{\log 5^{4}}{\log \frac{3}{5}} \\
& \quad x \approx-12.6026
\end{aligned}
$$

17. $948^{x-3}=13^{4 n+2}$
$\log 948^{x-3}=\log 13^{4 x+2}$
$(x-3) \log 948=(4 x+2) \log 13$
$x \log 948-3 \log 9 / 48=4 \times \log 13+2 \log 13$
$-4 \times \log 13+3 \log 948-2 \times \log 13+3 \log 548$
$x(\log 948-4 \log 13)=2 \log 13+3 \log 948$
$x=\frac{2 \log 13+3 \log 948}{\log 948-4 \log 13}=\frac{\log 13^{2}+\log 948^{3}}{\log 948-\log 13^{4}}=\frac{\log \left(13^{2} \cdot 948^{3}\right)}{\log \left(\frac{948}{13^{4}}\right)}$
$x \approx-7.5447$

$$
\begin{aligned}
& \text { 10. } 4^{3 p}=10 \\
& \log 4^{3 p}=\log 10 \\
& 3 p \log 4=\log 10 \\
& p=\frac{\log 10}{3 \log 4}
\end{aligned}
$$

22. $\log _{4}\left(1.67^{2}=2 \log _{4} 16=2 \frac{\log 1.6}{\log _{4} 4}\right.$

$$
\begin{aligned}
& \frac{\log 1.6^{2}}{\log 4}=\frac{2 \log 1.6}{\log 4} \\
& \log 2.56=\frac{\log 2.58}{\log 4} \\
& \frac{\log \sqrt{5}}{\log 6}=\frac{\log 5^{\frac{1}{2}}}{\log 6}=\frac{\frac{1}{2} \log 5}{\log 6}=\frac{\log 5}{2 \log 6}
\end{aligned}
$$

