15 problems

# Algebra 2 Assignment 46

NEW

1. $3^{4x} = 3^{x-3} \rightarrow 4x = x-3 \rightarrow 3x = -3 \rightarrow \boxed{x=-1}$

2. $4^x = 16 \rightarrow 4^x = 4^2 \rightarrow \boxed{x=2}$

3. $7^x = \frac{1}{49} \rightarrow 7^x = \frac{1}{7^2} \rightarrow 7^x = 7^{-2} \rightarrow \boxed{x=-2}$

4. $8^x = 4 \rightarrow \log_8 4 = x \rightarrow \frac{\log 4}{\log 8} = x \rightarrow .6667 = x \rightarrow \boxed{x=\frac{2}{3}}$
   OR $2^{3x} = 2^2 \rightarrow 3x = 2 \rightarrow x = \frac{2}{3}$

5. $\left(\frac{1}{9}\right)^m = 81^{m+4} \rightarrow 9^{-1m} = 81^{m+4} \rightarrow 9^{-m} = 9^{2(m+4)}$
   $\rightarrow -m = 2(m+4) \rightarrow -m = 2m+8 \rightarrow -3m = 8 \rightarrow \boxed{m=\frac{-8}{3}}$

6. $4^{2x-7} = 64 \rightarrow 4^{2x-7} = 4^3 \rightarrow 2x-7 = 3 \rightarrow 2x = 10 \rightarrow \boxed{x=5}$

7. $2^x = 53 \rightarrow \log_2 53 = x \rightarrow \boxed{\frac{\log 53}{\log 2} = x \rightarrow 5.728 = x}$

8. $8^{2x} = 124 \rightarrow 2x = \log_8 124 \rightarrow \frac{1}{2}\cdot 2x = \frac{\ln 124}{\ln 8}\cdot\frac{1}{2} \rightarrow \boxed{x = \frac{\ln 124}{2\ln 8} = 1.159}$

9. $4^{x+5} = 7 \rightarrow x+5 = \log_4 7 \rightarrow x = \log_4 7 - 5 \rightarrow \boxed{x = \frac{\ln 7}{\ln 4} - 5 = -3.596}$

10. $2^{x-5} = 9 \rightarrow x-5 = \log_2 9 \rightarrow x = \log_2 9 + 5 \rightarrow \boxed{x = \frac{\ln 9}{\ln 2} + 5 = 8.170}$

11. $e^x = 10 \rightarrow \log_e 10 = x \rightarrow \boxed{x = \ln 10 = 2.303}$

12. $4e^{2x} = 5 \rightarrow e^{2x} = \frac{5}{4} \rightarrow 2x = \ln\left(\frac{5}{4}\right) \rightarrow \boxed{x = \frac{\ln\left(\frac{5}{4}\right)}{2} = .112}$

3. $7 - e^x = 5 \rightarrow -7 \quad -7 \rightarrow -e^x = -2 \rightarrow \div -1 \quad \div -1 \rightarrow e^x = 2 \rightarrow \boxed{x = \ln 2 = .693}$

4. $-14 + 3e^x = 7$
$+14 \quad +14$

$\frac{3e^x}{3} = \frac{21}{3} \rightarrow e^x = 7 \rightarrow \boxed{x = \ln(7) = 1.946}$

15. $9e^{5x} - 4 = 50$
$+4 \quad +4$

$\frac{9e^{5x}}{9} = \frac{54}{9} \rightarrow e^{5x} = 6 \rightarrow 5x = \ln 6 \rightarrow \boxed{x = \frac{\ln(6)}{5} = .358}$