Solving Equations Using Common and Natural Logarithms Practice

Solve each equation using common logarithms.

1.) $8^x = 10$

$\log(8^x) = \log(10)$
$x\log(8) = \log(10)$
$x = \log(10)/\log(8)$
$x \approx 1.1073$

2.) $2.4^x = 20$

$\log(2.4^x) = \log(20)$
$x\log(2.4) = \log(20)$
$x = \log(20)/\log(2.4)$
$x \approx 3.4219$

3.) $1.8^{x-5} = 19.8$

$\log(1.8^{x-5}) = \log(19.8)$
$(x-5)\log(1.8) = \log(19.8)$
$x-5 = \log(19.8)/\log(1.8)$
$x = \log(19.8)/\log(1.8) + 5$
$x \approx 10.0795$

4.) $3^{5x} = 85$

$\log(3^{5x}) = \log(85)$
$5x\log(3) = \log(85)$
$x = \log(85) / (5\log(3))$
$x \approx 0.8088$

5.) $4^{2x} = 25$

$\log(4^{2x}) = \log(25)$
$2x\log(4) = \log(25)$
$x = \log(25) / (2\log(4))$
$x \approx 1.1610$

Solve each equation using natural logarithms,

6.) $6^x = 42$

$\ln(6^x) = \ln(42)$
$x\ln(6) = \ln(42)$
$x = \ln(42)/\ln(6)$
$x \approx 2.0860$

7.) $7^x = 4^{x+3}$

$\ln(7^x) = \ln(4^{x+3})$
$x\ln(7) = (x+3)\ln(4)$
$x\ln(7) = x\ln(4) + 3\ln(4)$
$x\ln(7) - x\ln(4) = 3\ln(4)$
$x(\ln(7) - \ln(4)) = 3\ln(4)$
$x = 3\ln(4) / (\ln(7) - \ln(4))$
$x \approx 7.4317$

8.) $1249 = 175e^{-0.04t}$

$\ln(1249) = \ln(175e^{-0.04t})$
$\ln(1249) = \ln(175) + \ln(e^{-0.04t})$
$\ln(1249) - \ln(175) = -0.04t$
$(\ln(1249) - \ln(175)) / -0.04 = t$
$t \approx -49.1328$

9.) $12 = e^{0.048x}$

$\ln(12) = \ln(e^{0.048x})$
$\ln(12) = 0.048x$
$\ln(12) / 0.048 = x$
$x \approx 51.7689$

10.) $8.4 = e^{t-2}$

$\ln(8.4) = \ln(e^{t-2})$
$\ln(8.4) = t-2$
$\ln(8.4) + 2 = t$
$t \approx 4.1282$