

solve each for x. Round to 3 decimals where necessary.

7.  $\log_5 x = 2$

$$5^2 = x$$

$$25 = x$$

8.  $e^{7x} = e^{x^2+6}$

$$7x = x^2 + 6$$

$$x^2 - 7x + 6$$

$$(x-6)(x-1)$$

$$x=6 \quad x=1$$

10.  $\log_{52} x = \frac{3}{4}$

$$52^{\frac{3}{4}} = x$$

$$19.364 \approx x$$

11.  $e^x = 20$

$$\ln e^x = \ln 20$$

$$x = \ln 20$$

$$x \approx 2.995$$

12.  $\log_7(x+2) = \log_7(3x+10)$

$$x+2 = 3x+10$$

$$-2 = 2x+10$$

$$-12 = 2x$$

$$-6 = x$$

13.  $\ln 2x = 7.3$

$$e^{\ln 2x} = e^{7.3}$$

$$2x = e^{7.3}$$

$$x = \frac{e^{7.3}}{2} \approx 740.149$$

14.  $5\log_3(x+5) = 40$

$$\log_3(x+5) = 8$$

$$3\log_3(x+5) = 3^8$$

$$x+5 = 3^8$$

$$x = 3^8 - 5 \approx 6556$$

15.  $4^x = 19$

$$\ln 4^x = \ln 19$$

$$x \ln 4 = \ln 19$$

$$x = \frac{\ln 19}{\ln 4} \approx 2.124$$

16.  $\ln \sqrt{x-1} = 4$

$$\ln(x-1)^{\frac{1}{2}} = 4$$

$$\frac{1}{2} \ln(x-1) = 4$$

$$\ln(x-1) = 8$$

$$e^{\ln(x-1)} = e^8$$

$$x-1 = e^8$$

$$x = e^8 + 1 \approx 2981.958$$

17.  $4e^{2x} = 48$

$$e^{2x} = 12$$

$$\ln e^{2x} = \ln 12$$

$$2x = \ln 12$$

$$x = \frac{\ln 12}{2} \approx 1.242$$

19.  $\log_5 7 + \log_5(x-2) = \log_5 3$

$$\log_5 7(x-2) = \log_5 3$$

$$\log_5 7x - 14 = \log_5 3$$

$$7x - 14 = 3$$

$$7x = 17$$

$$x = \frac{17}{7} \approx 2.429$$

18.  $\ln x = -2$

$$e^{\ln x} = e^{-2}$$

$$x = e^{-2}$$

$$x \approx .1353$$