

30.)

$$\log_x 1 = 0$$

$$1 = x^0$$

$$1 = 1$$

all real #

36.)

$$\log_{\sqrt{2}} \sqrt{2}^9 = x$$

$$9 = x$$

$$\left(\sqrt[5]{9}\right)^5 = \sqrt[5]{9^5} = 9$$

$$\left(\sqrt{9}\right)^2 = 9$$

$$\sqrt{9^2} = 9$$

$$\frac{8 \cdot 1032}{8}$$

32.)

$$x \log_x \frac{1}{10} = -1$$

$$\frac{1}{10} = x^{-1}$$

$$x \frac{1}{10} = \left(\frac{1}{x}\right)^x$$

$$\frac{1}{10} x = 1$$

$$x = 10$$

38.)

$$\log_4 \sqrt{64} = x$$

$$\sqrt{64} = 4^x \rightarrow$$

$$8 = 4^x$$

$$2^3 = 2^{2x}$$

$$* \log_2 2^3 = \log_2 2^{2x}$$

$$3 = 2x$$

$$\frac{3}{2} = x$$

$$64^{\frac{1}{2}} = 4^x$$

$$(4^3)^{\frac{1}{2}} = 4^x$$

$$4^{\frac{3}{2}} = 4^x$$

$$\frac{3}{2} = x$$

Solve for x.

$$\log_3(9) = x$$

$$9 = 3^x$$

$$3^2 = 3^x$$

$$2 = x$$

$$\log_{16}\left(\frac{1}{2}\right) = x$$

$$\frac{1}{2} = 16^x$$

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

$$-1 = 4x$$

$$-\frac{1}{4} = x$$

$$\log_{125}(5) = x$$

$$5 = 125^x$$

$$5^1 = (5^3)^x$$

$$5^1 = 5^{3x}$$

$$1 = 3x$$

$$\log_{27}(9) = x$$

$$9 = 27^x$$

$$3^2 = (3^3)^x$$

$$2 = 3x$$

$$\frac{2}{3} = x$$

Solve for x. Check for extraneous solutions.

$$\log_3(x) = 2$$

$$x = 3^2$$

$$x = 9 \quad \checkmark$$

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

$$x = 5^{-3}$$

$$x = \frac{1}{125}$$

$$\log_4(2x+2) = 3$$

$$2x+2 = 4^3$$

$$2x+2 = 64$$

$$2x = 62$$

$$x = 31$$

$$\log_3(x^2 + 8x) = 2$$

$$x^2 + 8x = 3^2$$

$$x^2 + 8x - 9 = 0$$

$$(x+9)(x-1) = 0$$

$$x = -9 \quad x = 1$$

Solve for x

$$\begin{aligned} 3^0 &= 1 \\ 3^1 &= 3 \\ 3^2 &= 9 \end{aligned}$$

$$3^x = 5$$

$$\begin{aligned} \log_3 3^x &= \log_3 5 \\ x &= \underline{1.46} \end{aligned}$$

$$5^{2x} = 14$$

$$\begin{aligned} \log_5 5^{2x} &= \log_5 14 \\ 2x &= \log_5 14 \\ x &= \frac{\log_5 14}{2} = .819 \end{aligned}$$

$$\begin{aligned} 5^0 &= 1 \\ 5^1 &= 5 \\ \hline 5^2 &= 25 \end{aligned}$$

$$2^{x-1} = 12$$

$$\begin{aligned} x-1 &= \log_2 12 \\ x-1 &= 3.58 \\ x &= \underline{4.58} \end{aligned}$$

$$3^{2x+1} = 8$$

$$\begin{aligned} 2x+1 &= \log_3 8 \\ 2x+1 &= 1.892 \\ 2x &= -.892 \\ x &= \underline{-.446} \end{aligned}$$

Solve for x. Check for extraneous solutions

$$\log_7(x+1) = \log_7(2x)$$

$$\begin{aligned} x+1 &= 2x \\ 1 &= x \end{aligned}$$

$$\log_7(2x+3) = \log_7(x-7)$$

$$2x+3 = x-7$$

$$\begin{aligned} x+3 &= -7 \\ x &= -10 \end{aligned} \quad \text{No Sol.}$$

HW: PG 576 #1-3, 21-24