Math 121 – Section 5.4 Solutions

28. Let $y = \log_3\left(\frac{1}{9}\right)$. Then $3^y = \frac{1}{9} = 3^{-2}$. Therefore, $y = -2$.

$$\boxed{\log_3\left(\frac{1}{9}\right) = -2}$$

31. Let $y = \log_{10}\sqrt{10}$. Then $10^y = \sqrt{10} = 10^{1/2}$. Therefore, $y = \frac{1}{2}$.

$$\boxed{\log_{10}\sqrt{10} = \frac{1}{2}}$$

35. Let $y = \ln\sqrt{e}$. Then $e^y = \sqrt{e} = e^{1/2}$. Therefore, $y = \frac{1}{2}$.

$$\boxed{\ln\sqrt{e} = \frac{1}{2}}$$

42. The domain of $g(x) = 8 + 5\ln(2x+3)$ is:

$$\boxed{2x + 3 > 0 \qquad \Rightarrow \qquad x > -\frac{3}{2}}$$

46. The domain of $h(x) = \log_3\left(\frac{x}{x-1}\right)$ is:

$$\boxed{\frac{x}{x-1} > 0 \qquad \Rightarrow \qquad x < 0 \ \text{ or } \ x > 1}$$

87. Solve $\log_3 x = 2$.

$$\begin{aligned} \log_3 x &= 2 \\ 3^2 &= x \\ \boxed{x &= 9} \end{aligned}$$

94. Solve $\ln e^{-2x} = 8$.

$$\begin{aligned} \ln e^{-2x} &= 8 \\ e^8 &= -2x \\ \boxed{x &= -\frac{1}{2}e^8} \end{aligned}$$

101. Solve $e^{2x+5} = 8$.

$$e^{2x+5} = 8$$
$$2x + 5 = \ln 8$$
$$\boxed{x = \frac{1}{2}(\ln 8 - 5)}$$

106. Solve $\log_3 3^x = -1$.

$$\log_3 3^x = -1$$
$$3^{-1} = 3^x$$
$$\boxed{x = -1}$$