6. Logarithmen

38. a.) $3^3 = 27$ also $\log_3 27 = 3$

b.) $7^0 = 1 \Rightarrow \log_7 1 = 0$

c.) $9^{1/2} = 3 \Rightarrow \log_9 3 = \frac{1}{2}$

d.) $3^{\frac{1}{4}} = \sqrt[4]{3} \Rightarrow \log_3 \sqrt[4]{3} = \frac{1}{4}$

e.) $2^{-7} = \frac{1}{128} \Rightarrow \log_2\left(\frac{1}{128}\right) = -7$

f.) $\frac{1}{\sqrt{e^3}} = e^{-3/2} \Rightarrow \ln(e^{-3/2}) = -\frac{3}{2}$

g.) $1000 = 10^3 \Rightarrow \lg(1000) = 3$

h.) $\sqrt{a^2} = a$

$\sqrt[5]{a} = a^{\frac{1}{5}}$

$\sqrt[4]{a^{15}} = (a^{15})^{1/4} = a^{15/20} \Rightarrow \log_a(\dots) = \frac{1}{20}$

i.) $\frac{81 = 3^4}{256 = 4^4} = \left(\frac{3}{4}\right)^4 \Rightarrow \log_{0.75}\left(\frac{3}{4}\right)^4 = 4$

39. a.) $x = 43$ b.) $x = 10^{-6}$

c.) $x^2 = 49$ d.) $x^4 = 81$

$x = 7$ $x = 3$

e.) $2^3 = x - 3$ f.) $5^2 = 3x - 8$

$x = 11$ $33 = 3x \Rightarrow x = 11$

40. a.) $x = \log_5 15 =$

b.) $2x - 1 = \log_{12} 3$

c.) $\frac{1}{x} = \log_8(0.5)$

d.) $3 \cdot (5^2)^x = 7^x \cdot 7^4$

$\frac{25^x}{7^x} = \frac{7^4}{3}$

$\left(\frac{25}{7}\right)^x = 800.\overline{3}$

$x = \log_{(\frac{25}{7})} 800.\overline{3} = \underline{5.25}$