38. $2^{x+1} = 5^{1-2x}$

$\log_2 2^{x+1} = \log_2 5^{1-2x}$

$x+1 = (1-2x)\log_2 5$

$x+1 = \log_2 5 - 2x\log_2 5$

$x + 2x\log_2 5 = \log_2 5 - 1$

$x(1 + 2\log_2 5) = \log_2 5 - 1$

$\boxed{x = \dfrac{\log_2 5 - 1}{1 + 2\log_2 5}}$

or $\log_5 2^{x+1} = \log_5 5^{1-2x}$

$(x+1)\log_5 2 = 1-2x$

$x\log_5 2 + \log_5 2 = 1-2x$

$x\log_5 2 + 2x = 1 - \log_5 2$

$x(\log_5 2 + 2) = 1 - \log_5 2$

$\boxed{x = \dfrac{1-\log_5 2}{\log_5 2 + 2}}$

40. $\left(\frac{4}{3}\right)^{1-x} = 5^x$

$\log_5 \left(\frac{4}{3}\right)^{1-x} = \log_5 5^x$

$(1-x)\log_5\left(\frac{4}{3}\right) = x$

$\log_5\left(\frac{4}{3}\right) = x + x\log_5 \frac{4}{3}$

$\log_5\left(\frac{4}{3}\right) = x\left(1 + \log_5\left(\frac{4}{3}\right)\right)$

$\boxed{x = \dfrac{\log_5\left(\frac{4}{3}\right)}{1+\log_5\left(\frac{4}{3}\right)}}$

42. $(.3)^{1+x} = 1.7^{2x-1}$

$\log_{.3}(.3)^{1+x} = \log_{.3}(1.7)^{2x-1}$

$(1+x) = 2x\log_{.3}1.7 - \log_{.3}1.7)$

$1 + \log_{.3}1.7 = x(2\log_{.3}1.7 - 1)$

$\boxed{x = \dfrac{1+\log_{.3}1.7}{2\log_{.3}1.7 - 1}}$

44. $e^{x+3} = \pi^x$

$\ln e^{x+3} = \ln \pi^x$

$x+3 = x\ln\pi$

$x - x\ln\pi = -3$

$\boxed{x = \dfrac{-3}{1-\ln\pi}}$

46. $.3(4^{.2x}) = .2$

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

$\log_4 4^{.2x} = \log 4\left(\frac{2}{3}\right)$

$.2x = \log_4 \frac{2}{3}$

$x = \dfrac{\log_4 \frac{2}{3}}{.2}$