

1.5
35) $e^x + e^{-x} = 3$

$$e^x \left(e^x + \frac{1}{e^x} \right) = 3 \cdot e^x$$

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

$$\begin{matrix} -3e^x & -3e^x \\ e^{2x} - 3e^x + 1 = 0 \end{matrix}$$

$$a = 1$$

$$b = -3$$

$$c = 1$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$e^x = \frac{3 \pm \sqrt{9 - 4}}{2}$$

$$e^x = \frac{3 \pm \sqrt{5}}{2}$$

$$\ln e^x = \ln \left(\frac{3 \pm \sqrt{5}}{2} \right)$$

$$x = \ln \left(\frac{3 \pm \sqrt{5}}{2} \right)$$

(1+2^{-y})
43) $x = \left(\frac{100}{1+2^{-y}} \right) 1+2^{-y}$

$$f(f^{-1}(x)) = 1 + 2^{+\log_2 \frac{100-x}{x}}$$

$$\cancel{x} + x 2^{-y} = 100$$

$$-x$$

$$\cancel{x} 2^{-y} = \frac{100-x}{x}$$

$$2^{-y} = \frac{100-x}{x}$$

$$\log_2 2^{-y} = \log_2 \frac{100-x}{x}$$

$$+y = -\log_2 \frac{100-x}{x}$$

$$= \frac{100}{\left(1 + \frac{100-x}{x} \right)} \cdot x$$

$$= \frac{100x}{\cancel{x} + 100 - \cancel{x}}$$

$$= \frac{100x}{100}$$

$$= x$$

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43 cont.

$$f^{-1}(f(x)) = -\log_2 \left(\frac{100 - \frac{100}{1+2^{-x}}}{\frac{100}{1+2^{-x}}} \right) \frac{(1+2^{-x})}{1+2^{-x}}$$

$$= -\log_2 \left(\frac{100 + 100 \cdot 2^{-x} - 100}{100} \right)$$

$$= -\log_2 \left(\frac{100 \cdot 2^{-x}}{100} \right)$$

$$= -\log_2 (2^{-x})$$

$$= - - x$$

$$= x$$

$$\frac{\frac{1+2^{-x}}{1}}{1+2^{-x}}$$

$$(y+3) \quad 23) \quad x = \frac{2y+1}{y+3} \cdot y+3$$

$$xy + \cancel{3x} = 2y + 1$$

$$-2y - \cancel{3x} - \cancel{2y} - 3x$$

$$\frac{y(x-2)}{x-2} = \boxed{\frac{-3x+1}{x-2}}$$

$$f(f^{-1}(x)) = \frac{2\left(\frac{-3x+1}{x-2}\right) + 1}{\left(\frac{-3x+1}{x-2}\right) + 3} \cdot \frac{x-2}{x-2}$$

$$= \frac{2(-3x+1) + 1(x-2)}{(-3x+1) + 3(x-2)}$$

$$= \frac{-6x+2+x-2}{-3x+1+3x-6}$$

$$= \frac{-5x}{-5}$$

$$= \textcircled{x}$$

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23 cont.

$$f^{-1}(f(x)) = \frac{-3\left(\frac{2x+1}{x+3}\right) + 1}{\left(\frac{2x+1}{x+3}\right) - 2} \cdot \frac{x+3}{x+3}$$

$$= \frac{-3(2x+1) + 1(x+3)}{(2x+1) - 2(x+3)}$$

$$= \frac{-6x - 3 + x + 3}{2x + 1 - 2x - 6}$$

$$= \frac{-5x}{-5}$$

$$= \textcircled{x}$$

$$37) \ln y = 2t + 4$$

$$e^{\ln y} = e^{2t+4}$$

$$y = e^{2t+4}$$

/C

$$21) x = \frac{1}{y^2}$$

$$f(f^{-1}(x)) = \left(\sqrt{\frac{1}{x}}\right)^2$$

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

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

$$y = \pm \sqrt{\frac{1}{x}}$$

$$= \textcircled{x}$$

$$f^{-1}(f(x)) = \sqrt{\frac{1}{x^2}}$$

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

$$= \textcircled{x}$$

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$$47) A = Pa^x$$

$$\frac{1000}{500} = \frac{500(1.0475)^x}{500}$$

$$2 = 1.0475^x$$

$$\ln 2 = \ln 1.0475^x$$

$$\frac{\ln 2}{\ln 1.0475} = \frac{x \ln 1.0475}{\ln 1.0475}$$

14.936 YEARS

$$33) (1.045)^t = 2$$

$$\ln (1.045)^t = \ln 2$$

$$\frac{t \ln (1.045)}{\ln (1.045)} = \frac{\ln 2}{\ln (1.045)} = t$$

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$$24) f(x) = \frac{x+3}{x-2}$$

$$(y-2)x = \frac{y+3}{y-2} \cdot y-2$$

$$xy - 2x = y+3$$

$$-y + 2x \quad -y + 2x$$

$$\frac{y(x-1)}{x-1} = \frac{2x+3}{x-1} = f^{-1}(x)$$

$$f^{-1}(f(x)) = \frac{\left(2\left(\frac{x+3}{x-2}\right) + 3\right)(x-2)}{\left(\frac{x+3}{x-2} - 1\right)(x-2)} = \frac{2x + \cancel{3} + 3x - \cancel{3}}{2x + 3 - 2x + 2}$$

$$= \frac{2(x+3) + 3(x-2)}{x+3 - (x-2)}$$

$$= \frac{2x + \cancel{6} + 3x - \cancel{6}}{x+3 - x + 2}$$

$$= \frac{5x}{5} = \textcircled{x}$$

$$f(f^{-1}(x)) = \frac{\left(\frac{2x+3}{x-1} + 3\right)x-1}{\left(\frac{2x+3}{x-1} - 2\right)x-1}$$

$$= \frac{2x+3 + 3(x-1)}{2x+3 - 2(x-1)}$$

$$= \frac{2x + \cancel{3} + 3x - \cancel{3}}{2x + 3 - 2x + 2}$$

$$= \frac{5x}{5} = \textcircled{x}$$