1.5

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

$(y+3)(x) = \left(\frac{2y+1}{y+3}\right)y+3$

$xy+3x = 2y+1$

$xy-2y = -3x+1$

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

$x^2 \cdot x^7$

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

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

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

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

$\frac{-6x+2+x-2}{-5} = \frac{-5x}{-5} = x$ ✓

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

$\ln 1.045^t = \ln 2$

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

$1.045^t = 2$

$\log_{1.045} 1.045^t = \log_{1.045} 2$

$t = \log_{1.045} 2$

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

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

$\log_b y = x \iff b^x = y$

(38) $\ln(y-1) - \ln 2 = x + \ln x + \ln 2$

$+\ln 2$

$x + \ln x + \ln 2$

$y-1 = e^{x + \ln x + \ln 2}$

$y-1 = e^x e^{\ln x} e^{\ln 2}$

$x \quad 2$

$y-1 = e^x (2x)$

$+1 \qquad +1$

$y = 2xe^x + 1$

1.5

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

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

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

$1+2^{-y} = \frac{100}{x}$

$-1 \qquad -1$

$2^{-y} = \frac{100}{x} - 1$

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

$-y = \log_2\left(\frac{100}{x} - 1\right)$

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

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

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

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

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

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

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

$\frac{100}{1+\frac{100-x}{x}}$

$\frac{100}{1+\frac{100}{x}-\frac{x}{x}}$

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

$\frac{100}{1}\cdot\frac{x}{100} = x$

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

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

$-\log_2\left(x + 2^{-x} - x\right)$

$-\log_2 2^{-x}$

$\log_2 2^{x} = x$

1.5

(18) $f(x) = x^{2/3}$ $\quad x \geq 0$

$x = (y^{2/3})^{3/2}$

$\pm x^{3/2} = y$

$\pm\sqrt{x^3} = y$

$\pm x^{3/2} = f^{-1}(x)$

$f(f^{-1}(x)) = (x^{3/2})^{2/3} = x$

$f^{-1}(f(x)) = (x^{2/3})^{3/2} = x$