45) $y = e^x \ln x$

$\frac{dy}{dx} = e^x \ln x + \frac{e^x}{x}$

49) $g(t) = (e^{-t} + e^t)^3$

$g'(t) = 3(e^{-t} + e^t)^2(-e^{-t} + e^t)$

51) $y = \ln(1 + e^{2x})$

$\frac{dy}{dx} = \frac{2e^{2x}}{1 + e^{2x}}$

55) $y = \frac{e^x + 1}{e^x - 1}$

$\frac{dy}{dx} = \frac{e^x(e^x - 1) - e^x(e^x + 1)}{(e^x - 1)^2}$

$= \frac{e^x[(e^x - 1) - (e^x + 1)]}{(e^x - 1)^2}$

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

59) $F(x) = \int_{\pi}^{\ln x} \cos e^t \, dt$

$F'(x) = \frac{\cos e^{\ln x}}{x} = \frac{\cos x}{x}$

61) $F(x) = e^{1-x}$ $(1, 1)$

63) $y = \ln e^{x^2}$ $(-2, 4)$

$y = x^2$

$m = \frac{dy}{dx} = 2x\Big|_{x=-2}$ $m = -4$

$y = -4x + b$

$4 = -4(-2) + b$

$4 = 8 + b$

$-4 = b$

$y = -4x - 4$

109) $\int e^x \sqrt{1 - e^x} \, dx$

$u = 1 - e^x$

$du = -e^x$

$-\int \sqrt{u} \, du = -\frac{2}{3}\sqrt{(1 - e^x)^3} + C$

113) $\int \frac{5 - e^x}{e^{2x}} \, dx$

$\int (5e^{-2x} - e^{-x}) \, dx$

$u = -2x$ $du = -2dx$

$v = -x$ $dv = -1dx$

$-\frac{5}{2}\int e^u \, du + \int e^v \, dv$

$-\frac{5}{2}e^{-2x} + e^{-x} + C$

115) $-\int e^{-x}\tan e^{-x}\,dx$

$u = e^{-x}$

$du = -e^{-x}$

$-\int \tan u\,du = -\ln|\sec e^{-x}| + C$

$\ln|\cos e^{-x}| + C$

117) $-\frac{1}{2}\int_{0}^{1} -2e^{-2x}\,dx$ $\quad u = -2x$ $\quad du = -2dx$

$-\frac{1}{2}\int_{0}^{-2} e^{u}$

$-\frac{1}{2}\left[e^{u}\right]_{0}^{-2} = -\frac{1}{2}\left[e^{-2} - e^{0}\right]$