8. Rewrite: $y = \frac{\ln x^{1/2}}{x^{1/2}} = \frac{1}{2}\ln x \cdot x^{-1/2}$

$$y' = \frac{1}{2}\left[\ln x \cdot -\frac{1}{2}x^{-3/2} + \frac{1}{x}x^{-1/2}\right]$$

$$y' = \frac{1}{2}\left[-\frac{\ln x}{2x^{3/2}} + \frac{1}{x^{3/2}}\right] = \frac{1}{4x^{3/2}}\left[-\ln x + 2\right]$$

9. $W = W_0\left[1+\frac{r}{n}\right]^{15}$

$$\frac{W}{W_0} = \left[1+\frac{r}{n}\right]^{15}$$

$$\left(\frac{W}{W_0}\right)^{1/15} = 1+\frac{r}{n}$$

$$\frac{r}{n} = \left(\frac{W}{W_0}\right)^{1/15} - 1$$

$$r = n\left(\frac{W}{W_0}\right)^{1/15} - n$$

10. $\ln W = \ln W_0 + nt\ln\left(1+\frac{r}{n}\right)$

$$\ln W - \ln W_0 = nt\ln\left(1+\frac{r}{n}\right)$$

$$\frac{\ln W - \ln W_0}{n\ln\left(1+\frac{r}{n}\right)} = t$$

11. $e^t\frac{dy}{dt} + e^t + 2e^t = \frac{dy}{dt} - 2$

$$e^t\frac{dy}{dt} - \frac{dy}{dt} = -3e^t - 2$$

$$\frac{dy}{dt}(e^t - 1) = -3e^t - 2$$

$$\frac{dy}{dt} = \frac{-3e^t - 2}{e^t - 1}$$

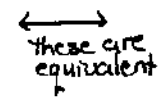
12. $3AB^{2x+1} = 5B$

$$\frac{B^{2x+1}}{B} = \frac{5}{3A}$$

$$B^{2x} = \frac{5}{3A}$$

$$2x\ln B = \ln\left(\frac{5}{3A}\right)$$

$$x = \frac{\ln\left(\frac{5}{3A}\right)}{2\ln B}$$



or $\ln 3 + \ln A + (2x+1)\ln B = \ln 5B$

$$(2x+1)\ln B = \ln 5B - \ln 3 - \ln A$$

$$2x+1 = \frac{\ln 5B - \ln 3A}{\ln B}$$

$$2x = \frac{\ln 5B - \ln 3A}{\ln B} - 1$$

$$x = \frac{1}{2}\left[\frac{\ln 5B - \ln 3A}{\ln B} - 1\right]$$

13. $B^2 + BC^t = 7BD$

$$BC^t = 7BD - B^2$$

$$C^t = 7D - B$$

$$t\ln C = \ln(7D - B)$$

$$t = \frac{\ln(7D-B)}{\ln C}$$