pg. 391 # 1-17 (odd), 25, 27

1) $\frac{dr}{ds} = .75r$ $\quad \int \frac{1}{r}\,dr = \int .75\,ds$

$\ln|r| = .75s + C$

$r = e^{.75s+C}$

$r = e^{.75s}e^{C} = Ce^{.75s}$

3) $\frac{dy}{dx} = \frac{x}{y}$ $\quad \int y\,dy = \int x\,dx$

$\frac{y^2}{2} = \frac{x^2}{2} + C \qquad y^2 = x^2 + C$

5) $\frac{dy}{dx} = \frac{x-1}{y^3}$ $\quad \int y^3\,dy = \int x-1\,dx$

$\frac{y^4}{4} = \frac{x^2}{2} - x + C$

$y^4 = 2x^2 - 4x + C$

7) $(2+x)\frac{dy}{dx} = 3y$ $\quad \int \frac{1}{3y}\,dy = \int \frac{1}{2+x}\,dx$

$\frac{1}{3}\ln y = \ln(2+x) + C$

$\ln y = \ln(2+x)^3 + C$

$y = (2+x)^3 + C$

9) $\int y\,dy = \int 4\sin x\,dx$

$\frac{y^2}{2} = -4\cos x + C$

$y^2 = -8\cos x + C$

11) $\sqrt{1-4x^2}\,\frac{dy}{dx} = x$ $\quad \int dy = \frac{-1}{8}\int \frac{-8x}{\sqrt{1-(2x)^2}}\,dx$

$u = 1-4x^2$

$du = -8x$

$y = -\frac{1}{8}\left(2\sqrt{1-4x^2}\right) + C$

$y = -\frac{1}{4}\sqrt{1-4x^2} + C$

13) $y \ln x = x\frac{dy}{dx}$ $\quad \int \frac{\ln x}{x}\,dx = \int \frac{1}{y}\,dy$

$\ln y = \frac{(\ln x)^2}{2} + C$

$y = C\,e^{(\ln x)^2/2}$

15) $y\frac{dy}{dx} = 2e^x$ $\quad \int y\,dy = \int 2e^x\,dx$

$\frac{y^2}{2} = 2e^x + C$

$y^2 = 4e^x + C$

$36 = 4(1) + C \quad C = 32$

$y^2 = 4e^x + 32$

17) $-y(x+1) = \frac{dy}{dx}$ $\quad \int \frac{1}{y}\,dy = \int -(x+1)\,dx$

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

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

$1 = C\,e^{-1/2} \quad C = .607$

$y = .607\,e^{-\frac{(x+1)^2}{2}}$

25) $\int 4y\,dx = \int x\,dx$

$2y^2 = \frac{x^2}{2} + C$ $\quad y^2 = \frac{x^2}{4} + C$

$4^2 = 0 + C \quad C = 16$

$y^2 = \frac{x^2}{4} + 16$

27) $\int \frac{1}{y}\,dy = \int \frac{1}{2x}\,dx$

$\ln y = \frac{1}{2}\ln x + C$

$y = C x^{1/2}$

$1 = C\sqrt{9} \quad C = \frac{1}{3}$

$y = \frac{1}{3}\sqrt{x}$