Hw 2.1 40

Hw 2.2 5, 13

2.2) #5

$$x\frac{dy}{dx} = 4y$$

$$x\,dy = 4y\,dx$$

$$\frac{1}{4y}\,dy = \frac{1}{x}\,dx$$

$$\frac{1}{4}\int\frac{1}{y}\,dy = \int\frac{1}{x}\,dx$$

$$\frac{1}{4}\ln|y| = \ln|x| + C$$

$$4\cdot\frac{1}{4}\ln|y| = 4\ln|x| + C$$

$$e^{\ln|y|} = e^{4\ln|x|+C}$$

$$y = e^{\ln x^4}\cdot e^{C_1}$$

$$\boxed{y = cx^4}$$

#13

$$(e^x+1)^2e^{-y}\,dx + (e^x+1)^3e^x\,dy = 0$$

$$(e^x+1)^2e^{-y}\,dx = -(e^x+1)^3e^x\,dy$$

$$\frac{1}{-(e^x+1)^3e^{-x}}\,dx = \frac{1}{(e^y+1)^2e^{-y}}\,dy$$

$$\int -e^x(e^x+1)^{-3}\,dx = \int e^y(e^y+1)^{-2}\,dy$$

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

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

Hw 2.1 40

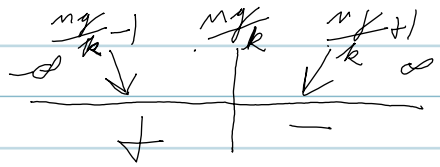
2.1) #40

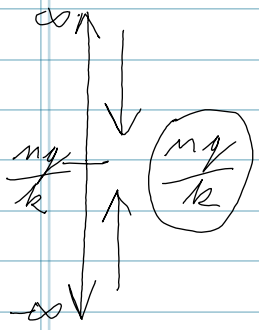
$$m\frac{dv}{dt} = mg - kv$$

$$\frac{dv}{dt} = g - \frac{k}{m}v$$

$$\boxed{g - \frac{k}{m}v = 0}$$

$$v = \frac{mg}{k}$$





$$g - \frac{k}{m}v \qquad g - \frac{k}{m}v$$

$$v = \frac{mg}{k} + 1 \qquad v = \frac{mg}{k} - 1$$

$$g - \frac{k}{m}\left(\frac{mg}{k} + 1\right) \qquad g - \frac{k}{m}\left(\frac{mg}{k} - 1\right)$$

$$g - g - \frac{k}{m} \qquad g - g + \frac{k}{m}$$