Intro to Calculus - Differential Equations

35. $\ln|y-1| = \frac{1}{3}x^3 + C \quad f(0)=3$ (0,3)

① Find C
② Solve for y

$\ln|2| = \frac{1}{3}(0)^3 + C$

$\ln 2 = C$

$\ln|y-1| = \frac{1}{3}x^3 + \ln 2$

$\ln|y-1| - \ln 2 = \frac{1}{3}x^3$

$\ln \frac{|y-1|}{2} = \frac{1}{3}x^3$

$e^{\frac{1}{3}x^3} = \frac{|y-1|}{2}$

$2e^{\frac{1}{3}x^3} = |y-1|$

$\pm 2e^{\frac{1}{3}x^3} = y-1$

$1 \pm 2e^{\frac{1}{3}x^3} = y$

$y = 1 + 2e^{\frac{1}{3}x^3}$

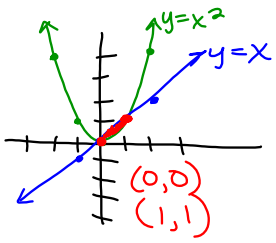
(0,3)

$1 + 2e^{\frac{1}{3}(0)^3} = 3$

$3 = 3$

$1 - 2e^{\frac{1}{3}(0)^3} = 3$

$-1 \neq 3$



36. $\frac{y^2}{2} = -x^2 + C, f(1) = -1$

37. $\ln|W-300| = \frac{1}{25}x + C, W(0) = 1400$ (0,1400)

① C
② Solve for W

$\ln|1400-300| = \frac{1}{25}(0) + C$

$\ln|1100| = C$

$\ln 1100 = C$

$\ln|w-300| = \frac{1}{25}x + \ln 1100$

$\ln|w-300| - \ln 1100 = \frac{1}{25}x$

$\ln \frac{|w-300|}{1100} = \frac{1}{25}x$

$e^{\frac{1}{25}x} = \frac{|w-300|}{1100}$

$1100e^{\frac{1}{25}x} = |w-300|$

$\pm 1100e^{\frac{1}{25}x} = w-300$

$300 \pm 1100e^{\frac{1}{25}x} = w$

$w = 300 + 1100e^{\frac{1}{25}x}$

(0,1400)

$300 + 1100e^{\frac{1}{25}(0)} = 1400$

$300 - 1100e^{\frac{1}{25}(0)} = 1400$