(A) $\left.\frac{dB}{dt}\right|_{B=40} = \frac{1}{5}(100-40) = 12$

$\left.\frac{dB}{dt}\right|_{B=70} = \frac{1}{5}(100-70) = 6$

$\frac{dB}{dt}$ at $B=40$ $>$ $\frac{dB}{dt}$ at $B=70$

So Bird is gaining weight faster when it weighs 40 grams

(b) $\frac{d}{dt}\frac{dB}{dt} \quad \frac{d}{dt}\frac{1}{5}(100-B)$

$\frac{d^2B}{dt^2} = \frac{1}{5}\left(-1\frac{dB}{dt}\right)$

$\frac{d^2B}{dt^2} = \frac{1}{5}\left(-\frac{1}{5}(100-B)\right)$

For all values of $B<100$, $\frac{d^2B}{dt^2} < 0$

on the graph of B, there are values that are concave up when $B < 100$

(c) $\frac{dB}{dt} = \frac{1}{5}(100 - B)$

$$\int \frac{dB}{100 - B} = \int \frac{1}{5}\, dt$$

$$\frac{\ln|100 - B|}{-1} = \frac{t}{5} + C$$

$$-\ln|100 - 20| = \frac{0}{5} + C$$

$$-\ln 80 = C$$

$$\frac{-1}{-1}\ln|100 - B| = \frac{\frac{t}{5} - \ln 80}{-1}$$

$$B = -80e^{-\frac{t}{5}} + 100$$

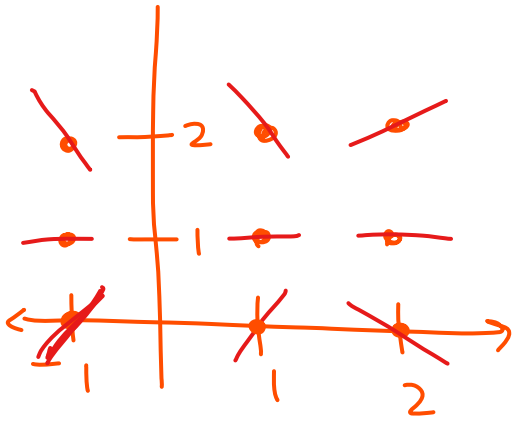
$$e^{\ln|100 - B|} = e^{-\frac{t}{5} + \ln 80}$$

$$100 - B = 80e^{-t/5} \rightarrow (-B = 80e^{-\frac{t}{5}} - 100)(-1)$$

(A) $\frac{dy}{dx} = \left(1 - \frac{2}{x^2}\right)(y-1)$

$(1,2)$ $\left.\frac{dy}{dx}\right|_{(1,2)} = \left(1 - \frac{2}{1^2}\right)(2-1) = (-1)(1) = -1$

(B)



(C) $\frac{dy}{dx} = \left(1 - \frac{2}{x^2}\right)(y-1)$

$$\int \frac{dy}{y-1} = \int \left(1 - \frac{2}{x^2}\right) dx$$

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

$$\ln|2-1| = 1 + 2(1)^{-1} + c$$

$$0 = 1 + 2 + c \Rightarrow c = -3$$

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

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