

P 40  
2011  
BC5  
a)

point  $(0, 1400)$

$$\text{Slope} = \frac{1}{25}(W-300) \Big|_{W=1400} = \frac{1}{25}(1400-300) = \frac{1100}{25} = 44$$

$$W - 1400 = 44(t - 0)$$

$$W = 44t + 1400 \Big|_{t=1/4}$$

$$W = 44\left(\frac{1}{4}\right) + 1400 = \boxed{1411 \text{ tons}}$$

$$b) \frac{d^2W}{dt^2} = \frac{1}{25}(1) \cdot \frac{dW}{dt} = \frac{1}{25} \cdot \frac{1}{25}(W-300) = \frac{W-300}{625}$$

$t = 1/4, W \approx 1411$   $\frac{d^2W}{dt^2}$  pos.  $W$  concave up

underestimate



$$c) \frac{dW}{dt} = \frac{1}{25}(W-300) \quad (0, 1400)$$

$$\int \frac{dW}{W-300} = \int \frac{1}{25} dt$$

$$\ln|W-300| = \frac{1}{25}t + C$$

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

$$\ln(1100) = C$$

$$\ln|W-300| = \frac{1}{25}t + \ln(1100)$$

$$e^{e \cdot \frac{1}{25}t} \cdot e^{\ln 1100}$$
$$W-300 = e^{\frac{1}{25}t} \cdot e^{\ln 1100}$$

$$W = 1100e^{\frac{1}{25}t} + 300$$