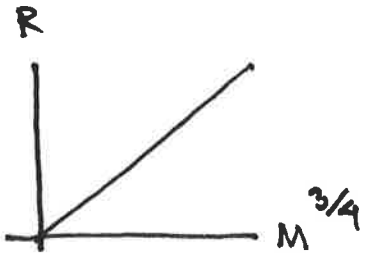
ASGv2 Ex 1.2 (Kleiber's law)

According to Kleiber's law, the specific metabolic rate r, which is the metabolic rate per unit mass, scales as $m^{-1/4}$. Mathematically,

$$r = \frac{R}{M} \propto M^{-1/4} \quad \text{or} \quad R \propto M^{3/4}$$

a)



b) If $R_{card} \approx 1$ watt

and $M_{card} \approx 40$ grams

and $M_{hippo} \approx 4 \times 10^6$ grams

then $R_{hippo} = ?$

$$\frac{R_H}{R_c} = \left(\frac{M_H}{M_c}\right)^{3/4} = \left(1 \times 10^5\right)^{3/4} = 5600$$

$$R_H \approx 5600 \text{ Watts}$$