

Homework assigned Wednesday, March 22.

If we have a species of organism, then $W(\ell)$ be the average length of the organism of length ℓ . We decided yesterday that in this case that $W(\ell)$ should be proportional to the cube of ℓ . That is

$$W(\ell) = c\ell^3$$

for some constant $c > 0$.

Example 1. Assume that oak tree of height 5 feet weighs 60 pounds. Then what is the weight of an oak tree of height 90 feet?

Solution: Letting h be the height we have

$$W(h) = ch^3$$

as the weight should be proportional to cube of the height. To find c we use $W(5) = 60$. This leads to the equation

$$W(5) = c5^3 = 60$$

and so

$$c = \frac{60}{5^3} = .48$$

and thus we have the formula

$$W(h) = .48h^3.$$

Therefore we can compute the weight of the oak of height 90 feet by

$$W(90) = .48(90)^3 = 349,920 \text{ pounds} = 174.96 \text{ tons.}$$

Problem 1. An orange of diameter 3.5 inches weighs 3.3 oz. What is the weight of an orange of diameter 4.5 inches? *Answer:* 7.01 oz.

Problem 2. If the average man of medium framed man of height 5' 6" is 145 lbs, what is the average weight of a medium framed man of height 6'? *Answer:* 188.25 lbs.

Problem 3. The average length, including tail, of a male feral cat is 33in and its average weight is 9.9lbs. The average length of a male Bengal tiger is 115in and its average weight is 520lbs. If a male feral cat grew to the same size as a Bengal tiger would it be heavier than the tiger? *Answer:* If the male feral cat grew to 115in, then it would weigh 418.97lbs. So the tiger would be heavier.