

Quiz #3

Name: Key*You must show your work to get full credit.*

Let us compare the "robustness" of a house cat to that of Siberian tiger. According to what I can find on the internet a large house cat has a head and body length of 18.1 inches and weighs 16.0 pounds. The head and body length of a large Siberian tiger is 91 inches.

1. If a 16.0 pound house cat that has a length of 18.1 inches is magnified up to 91 inches how much would it weight?

Weight is
proportional to
cube of length. Thus

$$W = CL^3$$

when $L = 18.1$, $W = 16.0$

so

$$16.0 = C(18.1)^3$$

$$C = \frac{16.0}{(18.1)^3} = .002698$$

Weight would be: 2033.3 lb.

→ so

$$W = .002698 L^3$$

For the Tiger

$L = 91$ and so

$$W = (.002698)(91)^3 = 2033.3$$

(For comparison Wikipedia gives the weight of a large Siberian tiger as 368 lbs.)

2. Using this same data what would be the length of a house cat that weighted 200lbs?

We wish to
solve

Length would be: 42.0 in.

$$200 = .002698 L^3$$

$$L^3 = (200 / .002698)$$

$$L = (200 / .002698)^{1/3}$$

$$= 42.0$$