Mathematics 172

Quiz 32 Name: Key

You must show your work to get full credit.

Let up compare the "robustness" pf a house cat to that of a 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 129 inches with a weight of 660 lbs.

1. If a 16 pound house cat with length 18.1 inches is scaled up to 129 inches how much would it weight?

Let W = weight
L = length

Then $W = cL^3$

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

so

$16.0 = c(18.1)^3$

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

Thus

$L = .0002698$

when $L = 129$

$W = (.0002698)(129)^3$

$= 5792.3$

Weight would be: 5,792.3 lbs

2. If a house cat weighted 200 pounds, how long would it be?

$W = 200$ so we wish to solve

$200 = .0002698 L^3$

for L

$L^3 = 200/.0002698$

$L = (200/.0002698)^{\wedge}(1/3)$

$= 42.006$

Length would be: 42.006 inches