Mathematics 172

Quiz 3 **Name:** Key

You must show your work to get full credit.

The largest lizard in the fossil record is Megalania which lived in Australia up until 50,000 years ago. It is believed that it have it had a similar nitche in the ecology of Australia that the Komodo dragon has in the ecology of the Komodo island. Since both Megalania and the Komodo dragon are both monitor lizards a reasonable guess is that Megalania resembled a scaled up version of a Komodo dragon.

The largest Komodo found had a length of 9.8 feet and a weight of 150 lb. The size of one of a femur of this lizard was 0.8 feet. A partial fossal of a Megalania is found and it has a fermur of length 1.56 feet.

1. If the Komodo dragon is scaled up to the size of the Megalania, what is the scaling factor?

Use the data on the femurs to find λ.

$\lambda(0.8 \text{ ft}) = 1.56 \text{ ft}$

$\lambda = \frac{1.56}{.8} = 1.95$

$\lambda =$ 1.95

2. Estimate what the length of the fossil Megalania would have been when alive.

Length scales by λ so

Length of Meg $= \lambda$ (Length K.D.)

$= 1.95(9.8)$ ft

$= 19.11$ ft

Length 19.11 ft

3. Estimate the what the weight of the Megalania would have been when alive.

Weight scales by λ^3

Weight of Meg $= \lambda^3$ (Weight of K.D.)

$= (1.95)^3(150)$ lbs

$= 1,112.2$ lbs

Weight 1,112.2 lbs