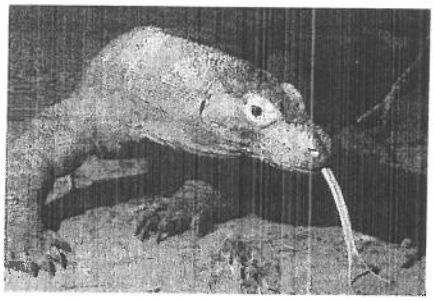
Mathematics 172

Quiz 2 Name: Key

You must show your work to get full credit.

The largest lizard species currently on earth is the komodo dragon. A large one of these is 3 meters long, weighs 70 kg and has claws 5 cm long.



Komodo dragon.

Up until about 50,000 years ago there was a species of lizard, *Megalania*, living in Australia which grew to a length of 5.5 meters. As both the komodo dragon and the *Megalana* are both types of monitor lizards it is not altogether unreasonable to assume that they have the same basic body plan. That is that *Megalania* was basically a scaled up version of the komodo dragon. Assuming this

1. Use the data above to estimate the length of the claws of a 5.5 meter *Megalania*.

The scale factor (= magnification factor) from a Komodo dragon to a Megalania is

$\lambda = \frac{5.5}{3} = 1.833$

So the claw length is $\lambda \times 5 = (1.833)(5) \approx 9.16$

Claw length $\approx$ 9.167 cm

2. Use this data to estimate the weight of a 5.5 meter *Megalania*.

Weight scales like the cube of the magnification factor

So

$$\text{Megalania weight} = \lambda^3 (\text{Komodo dragon weight}) = (1.833)^3 \times 70 = 431.12$$

Weight $\approx$ 431.12 kg.