1. On average there are 22 dandelions growing on every m^2 of neglected lawn. What is the population size of dandelions on a neglected 300 m^2 lawn?

$$\frac{avg.\#\ of\ individuals\ per\ section}{Area\ of\ section} * total\ area = Population\ size$$

22 dandelions/m^2*300m^2 = 6600 dandelions

2. 60 squirrels are captured, marked with tags and released. On the second capture of 120 squirrels, 20 have tags on them. What is the population size?

$$Population\ size$$
$$= \frac{total\ \#of\ animals\ captured\ 2nd\ time}{\#\ of\ marked\ animals\ recaptured} * original\ \#\ of\ marked\ animals$$

= 120/20 *60 =360 squirrels.

Notice that you have only recaptured 1/3 (=20/60) of the tagged animals, so your total population has to be 3 times as big as your 120 sample.

3. In a national park scientists caught and marked 25 caribous with a Boston Red Sox logo. After releasing them, they caught 52 caribous the following year, 15 of which were wearing the Boston Red Sox logo. Estimate the total population of caribou in the park.

52/15 *25 = 87 caribous(rounded)

4. What method for measuring population size is most appropriate in the following cases?

a) Number of beetles in your backyard.   Random sampling of area

b) Number of birch trees on your short street.   Individual count

c) Number of foxes on an island.   Capture-recapture

5. In June 2010, the world had an estimated population of 6 828 300 000. Quebec has an area of 1 524 000 km^2.

a) Because of the bad Halak trade and the Reform, it's unlikely that the whole world will move to Quebec. But suppose they did, what would the population density become?

6 828 300 000 people/1524000 km^2= 4480 people/ km^2

b) How does your answer compare to the population density of Mumbai =

$29\ 650/\text{km}^2$?

Quebec would still be a lot less densely populated than Mumbai, but of course it would be unmanageable to have such a giant city. There would not be enough natural resources even in a big province such as our own.

Incidentally, there are 52 cities in the world with a population density exceeding $4480/\text{km}^2$.