Population Math

1. One thousand two hundred and seventy deer are living on an island that is eight hundred and thirty square kilometers in size. What is the population density of the deer per square kilometer?

\[
\frac{1270 \text{ deer}}{830 \text{ km}^2} = 1.53 \text{ deer per km}^2
\]

2. A city with 53,340 people has 876 births. What is the birth rate (as a %/1000) (Birth rate)?

For percent
\[
\left( \frac{876}{53,340} \right) \times 100 = 1.65\%
\]

For per 1000
\[
\left( \frac{876}{53,340} \right) \times 1000 = 16.6 \text{ per 1,000}
\]

3. Another city experiences 12 deaths for each thousand people. What is the death rate (as a %/1000) (Death rate)?

For percent
\[
\left( \frac{12}{1000} \right) \times 100 = 1.2\%
\]

For per 1,000
\[
\frac{12}{1000} \text{ is already done}
\]

\[
12 \text{ per 1,000}
\]

4. A village of 23,473 people has 2,342 births and 473 deaths. What is the growth rate for this village? (Population Growth Rate) - modified

\[
\left( \frac{23,473 - 473}{23,473} \right) \times 100 = 7.96\%
\]

5. A small country of 744,785 people has 44,678 immigrants and 12,567 emigrants. They also experience 15,898 deaths and 35,665 births. What is the growth rate of this small country?

(Population Growth Rate)

\[
\left( \frac{35,665 + 44,678 - (15,898 + 12,567)}{744,785} \right) \times 100
\]

\[
6.97\%
\]
6. How many years will it take for this country to double its population?

(Doubling Time) - Use answer from #5

\[
\frac{70}{10.97} = 10 \text{ years}
\]

7. If a country were doubling its population every 35 years, what would its growth rate be?

(Doubling Time) modified

\[
\frac{70}{35} = 2\%
\]

Part 2:

1. At the end of 2002, there were 1,284.53 million people living in China. China is the third largest country in the world with an area of 9.6 million square kilometers. What is the population density of China?

\[
\frac{1,284.53}{9.6} = 133.8 \text{ people per km}^2
\]

2. China has 130.04 million hectares of land under cultivation. What is the average amount of cultivated land in sq km that supports each person (100 hectares = sq km = 247 acres)?

(Convert to sq km first) Also, use population from Part 2, #1

\[
\frac{130.04}{100} = 1.3 \text{ million sq km}
\]

\[
\frac{1.3}{1284.53} = 0.001 \text{ km}^2 \text{ / person}
\]

3. At the end of 2002, there were 502 million urban residents. What % of the total population were living in cities?

\[
\frac{502 \text{ million}}{1284.53 \text{ million}} \times 100 = 39\%
\]
4. At the end of 2002, there were 661.15 million males in China. What % of the total pop were males?

\[
\frac{661.15 \text{ million}}{1284.53 \text{ million}} \times 100 = 51\%
\]

5. 22.4% of China’s total population was in the age group of 0-14. How many children is that? If the average number of students in each elementary school is 500, how many elementary schools are needed in China? (Assume all children between 0-14 attend school)

\[
\frac{1284.53 \times 0.224}{288,000,000/500} = \frac{288 \text{ million children}}{576,000 \text{ schools}}
\]

6. In 2002, 16.47 million babies were born in China. What was the birth rate (as a %/1,000)

For percent
\[
\left(\frac{16.47}{1284.53}\right) \times 100 = 1.3\%
\]

For per 1000
\[
\left(\frac{16.47}{1284.53}\right) \times 1000 = 13 \text{ per 1,000}
\]

7. In 2002, 8.21 million people died in China. What was the death rate (as a % of 1,000)

For percent
\[
\left(\frac{8.21}{1284.53}\right) \times 100 = 0.64\%
\]

For per 1000
\[
\left(\frac{8.21}{1284.53}\right) \times 1000 = 6.4 \text{ per 1,000}
\]

8. What was the total overall growth rate of China’s population in 2002? You will need #s from 6 & 7.

\[
\left(\frac{16.47 - 8.21}{1284.53}\right) \times 100 = 0.64\%
\]

9. Using the rate from question 8, how many years will it take for China’s pop to double?

\[
\frac{70}{0.64\%} = 109 \text{ years}
\]
10. In 2002 about 1.1 million cars were sold in China. In 2003 a little more than 2 million cars were sold. What was the % increase in car sales? (Percent change formula)

\[
\left( \frac{2 \text{ million} - 1.1 \text{ million}}{1.1 \text{ million}} \right) \times 100 = 82\%
\]

11. Most people living in urban China use bicycles for transportation. Only 3 people per 1000 actually own a car. How many people own cars in China? (Multiple steps!)

* Change 3 per 1,000 to percent, then use the percent

\[
\left( \frac{3}{1000} \right) \times 100 = 0.3\%
\]

\[
1284.53 \times 0.003 = 3.85 \text{ million}
\]

12. Oddly, while China has relatively few cars on the highways compared to the size of its population, they have the highest number of traffic fatalities in the world: more than 100,000 per year. What is the per capita death rate in China for car fatalities?

(Hint) 100,000 needs to be converted to a million figure

\[
\frac{100,000}{1,000,000} = 0.1 \text{ million}
\]

\[
\frac{0.1 \text{ million}}{1284.53 \text{ million}} \times 100 = 0.008\%
\]