Key

Population Problems – SHOW ALL WORK!!

Given the following information, answer questions 1-4.

Schuhlsville is an island of 5000 square miles off the coast of Jabooty. There are currently 250,000 inhabitants of the island. Last year, there were 12,000 new children born and 10,000 people were recorded as deceased.

1. What is the current population density?

$$\frac{\text{pop}}{\text{area}} = \frac{250{,}000 \text{ people}}{5000 \text{ mi}^2} = 50 \text{ people/mi}^2$$

2. What are the birth and death rates?

$$BR = \frac{12{,}000}{250{,}000} = 0.048 = 4.8\%$$

$$CBR = \times 1000 = 48$$

$$DR = \frac{10{,}000}{250{,}000} = 0.04 \text{ or } 4\%$$

$$CDR = \times 1000 \quad 40$$

3. What is the population growth rate (r)?

$$\frac{(48-40)}{10} = 0.8\%$$

4. In how many years will the population of Schuhlsville double?

$$\frac{70}{0.8} = 87.5 \text{ yrs}$$

Given the following information, answer questions 5-8.

The country of Transylvania contains 2.3 million people (vampires not included) and covers 800,000 square miles. In the year after the last census, there were 109,000 new children born and 111,000 people died.

5. What is the current population density?

$$\frac{2.3 \times 10^6 \text{ people}}{800{,}000 \text{ mi}^2} = 2.9 \text{ people/mi}^2$$

6. What are the birth and death rates?

$$\frac{109{,}000}{2.3 \times 10^6} = 0.047 = 4.7\%$$

$$\times 1000$$

$$47 = CBR$$

$$\frac{111{,}000}{2.3 \times 10^6} = 0.048 = 4.8\%$$

$$\times 1000$$

$$47 = CDR$$

7. What is the population growth rate (r)?

$$\frac{47-48}{10} = -0.1\%$$

8. In how many years will the population of Transylvania double?

$$\frac{70}{-0.1} = 700 \text{ yrs} \quad \text{pop will be reduced by } \frac{1}{2}$$

9. Given a 2010 world population growth rate of about 1.3% per year, how long would it take the world's population to double?

$\frac{70}{1.3} = 54$ yrs

10. If a country doubles its population in 56 years, what has its population growth rate during that time?

$\frac{70}{r} = 56 \rightarrow \frac{70}{56} = r = 1.25$

11. Calculate the growth rates and doubling times for the countries listed below.

Country	Birth Rate (2011)	Death Rate (2011)	Growth Rate (r)	Doubling Time yrs
United States	13	8	$\frac{13-8}{10} = 0.5$	$\frac{70}{.5} = 140$
Mexico	19	5	1.4	50
Japan	8	9	−0.1	700 (halved)
United Kingdom	13	9	0.4	175
China	12	7	0.5	140
India	23	7	1.6	43.8
Nigeria	41	16	2.5	28
South Africa	21	14	0.7	100
Canada	11	7	0.4	175
Italy	9	10	-0.1	700 (halved)

12. What would happen to the population growth rate of a country that maintains a high crude birth rate of 32 but was able to reduce their crude death rate from 28 to 12?

$\frac{32-28}{10} = 0.4\%$ $\frac{32-12}{10}$ 2%

What would happen to the doubling time of this country?

$\frac{70}{.4} = 175$ yrs $\frac{70}{2} = 35$ yrs