

(a) To identify the two countries with the same crude growth rate (r), we employ the formula:

$$r = \frac{\text{Crude Birth rate} - \text{Crude Death Rate} + \text{Immigration Rate}}{10}$$

Calculating r for each country yields the following:

I.

$$r = \frac{15 - 13 + 3}{10} = 0.5\%$$

II.

$$r = \frac{18 - 5 + 1}{10} = 1.4\%$$

III.

$$r = \frac{20 - 10 + 1}{10} = 1.1\%$$

IV.

$$r = \frac{16 - 12 + 1}{10} = 0.5\%$$

Countries I and IV have the same r of 0.5%.

(b) The doubling time (t_d) for Country II is given by the Rule of 70:

$$t_d = \frac{70}{r} = \frac{70}{1.4} = 50 \text{ years}$$

(c) To predict a country's future population (P_t), we consider P_0 as the current population and use the formula

$$P_t = P_0 e^{rt}$$

For each country:

I.

$$P_t = 100000000 \cdot e^{0.005 \cdot 140} \approx 16621985$$

II.

$$P_t = 250000000 \cdot e^{0.014 \cdot 140} \approx 314880594$$

III.

$$P_t = 250000000 \cdot e^{0.011 \cdot 140} \approx 224882933$$

IV.

$$P_t = 100000000 \cdot e^{0.005 \cdot 140} \approx 166626794$$

Country III is predicted to have the population closest to 200000000. Thus, Country III is the predicted country.