

## Population Demographics Formulas

### DEMOGRAPHERS KEY EQUATIONS:

$$\text{Crude birthrate (births/1000)} = \frac{\text{live births per year}}{\text{Mid-year population}} \times 1000$$

$$\text{Crude deathrate (deaths/1000)} = \frac{\text{deaths per year}}{\text{Mid-year population}} \times 1000$$

$$\% \text{ Annual rate of population change ("r")} = \frac{\text{birthrate} - \text{deathrate}}{10}$$

$$\text{Population doubling time (years)} = \frac{70}{\text{Annual rate of change (\%)}}$$

Net Annual Growth Rate: (Births - Deaths) + (immigrants - emigrants)

$$\frac{N_0 + (B-D) + (I - E)}{N_0}$$

Predicting population growth over time:  $N_{(t)} = N_{(0)} * e^{(r*t)}$

Mid-year Pop x  $(2.718^{((r/100) \times t)})$

$$\text{Rate of change} = \frac{(\text{Current population} - \text{Initial Population})}{\text{Initial Population}} \times 100$$