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Population Forecast Method Formulas

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List of 37 Population Forecast Method Formulas

Population Forecast Method

Arithmetic Increase Method

1) Average Increment for 2 Decade given Future Population by Arithmetic Increase Method

Open Calculator

fx $$\bar{X} = \frac{P_n - P_o}{2}$$

ex $$37500 = \frac{350000 - 275000}{2}$$

2) Average Increment for 3 Decade given Future Population by Arithmetic Increase Method

Open Calculator

fx $$\bar{X} = \frac{P_n - P_o}{3}$$

ex $$25000 = \frac{350000 - 275000}{3}$$

3) Average Increment for n Decade given Future Population by Arithmetic Increase Method

Open Calculator

fx $$\bar{X} = \frac{P_n - P_o}{n}$$

ex $$37500 = \frac{350000 - 275000}{2}$$

4) Future Population at End of 2 Decades by Arithmetic Increase Method

Open Calculator

fx $$P_n = P_o + 2 \cdot \bar{X}$$

ex $$350000 = 275000 + 2 \cdot 37500$$

5) Future Population at End of 3 Decades by Arithmetic Increase Method

Open Calculator

fx $$P_n = P_o + 3 \cdot \bar{X}$$

ex $$387500 = 275000 + 3 \cdot 37500$$

6) Future Population at End of n Decades by Arithmetic Increase Method

Open Calculator

fx $$P_n = P_o + n \cdot \bar{X}$$

ex $$350000 = 275000 + 2 \cdot 37500$$

7) Number of Decades given Future Population by Arithmetic Increase Method

Open Calculator

fx $$n = \frac{P_n - P_o}{\bar{X}}$$

ex $$2 = \frac{350000 - 275000}{37500}$$

8) Present Population given Future Population at End of 2 Decades by Arithmetic Increase Method

Open Calculator

fx $$P_o = P_n - 2 \cdot \bar{X}$$

ex $$275000 = 350000 - 2 \cdot 37500$$

9) Present Population given Future Population at End of 3 Decades by Arithmetic Increase Method

Open Calculator

fx $$P_o = P_n - 3 \cdot \bar{X}$$

ex $$237500 = 350000 - 3 \cdot 37500$$

10) Present Population given Future Population at End of n Decades by Arithmetic Increase Method

Open Calculator

fx $$P_o = P_n - n \cdot \bar{X}$$

ex $$275000 = 350000 - 2 \cdot 37500$$

Geometric Increase Method

11) Average Percentage Increase given Future Population from Geometrical Increase Method

Open Calculator

fx $$r = \left(\left(\frac{P_n}{P_o}\right)^{\frac{1}{n}} - 1\right) \cdot 100$$

ex $$12.81521 = \left(\left(\frac{350000}{275000}\right)^{\frac{1}{2}} - 1\right) \cdot 100$$

12) Average Percentage Increase given Future Population of 2 Decades by Geometrical Method

Open Calculator

fx $$r = \left(\left(\frac{P_n}{P_o}\right)^{\frac{1}{2}} - 1\right) \cdot 100$$

ex $$12.81521 = \left(\left(\frac{350000}{275000}\right)^{\frac{1}{2}} - 1\right) \cdot 100$$

13) Average Percentage Increase given Future Population of 3 Decades by Geometrical Method

Open Calculator

fx $$r = \left(\left(\frac{P_n}{P_o}\right)^{\frac{1}{3}} - 1\right) \cdot 100$$

ex $$8.370676 = \left(\left(\frac{350000}{275000}\right)^{\frac{1}{3}} - 1\right) \cdot 100$$

14) Future Population at End of 2 Decades in Geometrical Increase Method

Open Calculator

fx $$P_n = P_o \cdot \left(1 + \left(\frac{r}{100}\right)\right)^2$$

ex $$350029.7 = 275000 \cdot \left(1 + \left(\frac{12.82}{100}\right)\right)^2$$

15) Future Population at End of 3 Decades in Geometrical Increase Method

Open Calculator

fx $$P_n = P_o \cdot \left(1 + \left(\frac{r}{100}\right)\right)^3$$

ex $$394903.5 = 275000 \cdot \left(1 + \left(\frac{12.82}{100}\right)\right)^3$$

16) Future Population at End of n Decades in Geometrical Increase Method

Open Calculator

fx $$P_n = P_o \cdot \left(1 + \left(\frac{r}{100}\right)\right)^n$$

ex $$350029.7 = 275000 \cdot \left(1 + \left(\frac{12.82}{100}\right)\right)^2$$

17) Present Population given Future Population from Geometrical Increase Method

Open Calculator

fx $$P_o = \frac{P_n}{\left(1 + \left(\frac{r}{100}\right)\right)^n}$$

ex $$274976.7 = \frac{350000}{\left(1 + \left(\frac{12.82}{100}\right)\right)^2}$$

18) Present Population given Future Population of 2 Decades by Geometrical Increase Method

Open Calculator

fx $$P_o = \frac{P_n}{\left(1 + \left(\frac{r}{100}\right)\right)^2}$$

ex $$274976.7 = \frac{350000}{\left(1 + \left(\frac{12.82}{100}\right)\right)^2}$$

19) Present Population given Future Population of 3 Decades by Geometrical Increase Method

Open Calculator

fx
$$P_o = \frac{P_n}{\left(1+\left(\frac{r}{100}\right)\right)^3}$$

ex
$$243730.4 = \frac{350000}{\left(1+\left(\frac{12.82}{100}\right)\right)^3}$$

Growth Composition Analysis Method

20) Average Birth Rate Per Year given Future Population

Open Calculator

fx
$$B.R. = \frac{P_n - P_o}{N} + D.R. - M.R.$$

ex
$$10000/\text{Year} = \frac{350000 - 275000}{10\text{Year}} + 5000/\text{Year} - 2500/\text{Year}$$

21) Average Death Rate Per Year given Future Population

Open Calculator

fx
$$D.R. = B.R. + M.R. - \frac{P_n - P_o}{N}$$

ex
$$5000/\text{Year} = 10000/\text{Year} + 2500/\text{Year} - \frac{350000 - 275000}{10\text{Year}}$$

22) Future Population at End of n Year given Migration

Open Calculator

fx $$P_n = P_o + (B.R. - D.R. + M.R.) \cdot N$$

ex $$350000 = 275000 + (10000/\text{Year} - 5000/\text{Year} + 2500/\text{Year}) \cdot 10\text{Year}$$

23) Migration given Future Population at End of n Year

Open Calculator

fx $$M.R. = \frac{P_n - P_o}{N} - B.R. + D.R.$$

ex $$2500/\text{Year} = \frac{350000 - 275000}{10\text{Year}} - 10000/\text{Year} + 5000/\text{Year}$$

24) Natural Increase given Design Period

Open Calculator

fx $$N.I. = \frac{P_n - P_o}{N} - M.R.$$

ex $$5000 = \frac{350000 - 275000}{10\text{Year}} - 2500/\text{Year}$$

25) Present Population given Forecasted Population

Open Calculator

fx $$P_o = P_n - (B.R. - D.R. + M.R.) \cdot N$$

ex $$275000 = 350000 - (10000/\text{Year} - 5000/\text{Year} + 2500/\text{Year}) \cdot 10\text{Year}$$

Incremental Increase Method

26) Average Arithmetic Increase Per Decade given Future Population from Incremental Increase Method

Open Calculator

fx $$\bar{x} = \frac{P_n - P_o - \left(n \cdot \frac{n+1}{2}\right) \cdot \bar{y}}{n}$$

ex $$25500 = \frac{350000 - 275000 - \left(2 \cdot \frac{2+1}{2}\right) \cdot 8000}{2}$$

27) Average Arithmetic Increase Per Decade given Future Population of 2 Decades by Incremental Method

Open Calculator

fx $$\bar{x} = \frac{P_n - P_o - \left(2 \cdot \frac{2+1}{2}\right) \cdot \bar{y}}{2}$$

ex $$25500 = \frac{350000 - 275000 - \left(2 \cdot \frac{2+1}{2}\right) \cdot 8000}{2}$$

28) Average Arithmetic Increase Per Decade given Future Population of 3 Decades by Incremental Method

Open Calculator

fx $$\bar{x} = \frac{P_n - P_o - \left(3 \cdot \frac{3+1}{2}\right) \cdot \bar{y}}{3}$$

ex $$9000 = \frac{350000 - 275000 - \left(3 \cdot \frac{3+1}{2}\right) \cdot 8000}{3}$$

29) Average Incremental Increase given Future Population from Incremental Increase Method

Open Calculator

fx $$\bar{y} = \frac{P_n - P_o - n \cdot \bar{x}}{n \cdot \frac{n+1}{2}}$$

ex $$8000 = \frac{350000 - 275000 - 2 \cdot 25500}{2 \cdot \frac{2+1}{2}}$$

30) Average Incremental Increase given Future Population of 2 Decades by Incremental Method

Open Calculator

fx $$\bar{y} = \frac{P_n - P_o - 2 \cdot \bar{x}}{2 \cdot \frac{2+1}{2}}$$

ex $$8000 = \frac{350000 - 275000 - 2 \cdot 25500}{2 \cdot \frac{2+1}{2}}$$

31) Average Incremental Increase given Future Population of 3 Decades by Incremental Method

Open Calculator

fx $$\bar{y} = \frac{P_n - P_o - 3 \cdot \bar{x}}{3 \cdot \frac{3+1}{2}}$$

ex $$-250 = \frac{350000 - 275000 - 3 \cdot 25500}{3 \cdot \frac{3+1}{2}}$$

32) Future Population at End of 2 Decades in Incremental Increase Method

Open Calculator

fx $$P_n = P_o + 2 \cdot \bar{x} + \left(2 \cdot \frac{2+1}{2}\right) \cdot \bar{y}$$

ex $$350000 = 275000 + 2 \cdot 25500 + \left(2 \cdot \frac{2+1}{2}\right) \cdot 8000$$

33) Future Population at End of 3 Decades in Incremental Increase Method

Open Calculator

fx $$P_n = P_o + 3 \cdot \bar{x} + \left(3 \cdot \frac{3+1}{2}\right) \cdot \bar{y}$$

ex $$399500 = 275000 + 3 \cdot 25500 + \left(3 \cdot \frac{3+1}{2}\right) \cdot 8000$$

34) Future Population at End of n Decades in Incremental Increase Method

Open Calculator

fx $$P_n = P_o + n \cdot \bar{x} + \left(n \cdot \frac{n+1}{2}\right) \cdot \bar{y}$$

ex $$350000 = 275000 + 2 \cdot 25500 + \left(2 \cdot \frac{2+1}{2}\right) \cdot 8000$$

35) Present Population given Future Population from Incremental Increase Method

Open Calculator

fx $$P_o = P_n - n \cdot \bar{x} - \left(n \cdot \frac{n+1}{2} \right) \cdot \bar{y}$$

ex $$275000 = 350000 - 2 \cdot 25500 - \left(2 \cdot \frac{2+1}{2} \right) \cdot 8000$$

36) Present Population given Future Population of 2 Decades by Incremental Increase Method

Open Calculator

fx $$P_o = P_n - 2 \cdot \bar{x} - \left(2 \cdot \frac{2+1}{2} \right) \cdot \bar{y}$$

ex $$275000 = 350000 - 2 \cdot 25500 - \left(2 \cdot \frac{2+1}{2} \right) \cdot 8000$$

37) Present Population given Future Population of 3 Decades by Incremental Increase Method

Open Calculator

fx $$P_o = P_n - 3 \cdot \bar{x} - \left(3 \cdot \frac{3+1}{2} \right) \cdot \bar{y}$$

ex $$225500 = 350000 - 3 \cdot 25500 - \left(3 \cdot \frac{3+1}{2} \right) \cdot 8000$$

Variables Used

- **B.R.** Average Birth Rate Per Year *(1 Per Year)*
- **D.R.** Average Death Rate Per Year *(1 Per Year)*
- **M.R.** Average Migration Rate per Year *(1 Per Year)*
- **n** Number of Decades
- **N** Number of Years *(Year)*
- **N.I.** Natural Increase
- P_n Forecasted Population
- P_o Last Known Population
- **r** Average % Growth Rate
- $\bar{x}$ Average Arithmetic Increase in Population
- $\bar{X}$ Average Arithmetic Increase
- $\bar{y}$ Average Incremental Increase in Population

Constants, Functions, Measurements used

- Measurement: **Time** in Year (Year)
  Time Unit Conversion
- Measurement: **Time Inverse** in 1 Per Year (1/Year)
  Time Inverse Unit Conversion

Check other formula lists

- **Population Forecast Method Formulas**

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