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Runoff Density and Form Factor Formulas

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List of 17 Runoff Density and Form Factor Formulas

Runoff Density and Form Factor ↗

Drainage Density ↗

1) Catchment Area given Drainage Density ↗

fx $A_{\text{catchment}} = \frac{L_s}{D_d}$

[Open Calculator ↗](#)

ex $2\text{m}^2 = \frac{80\text{km}}{40}$

2) Drainage Density ↗

fx $D_d = \frac{L_s}{A_{\text{catchment}}}$

[Open Calculator ↗](#)

ex $40 = \frac{80\text{km}}{2.0\text{m}^2}$

3) Length of all Streams given Drainage Density ↗

fx $L_s = D_d \cdot A_{\text{catchment}}$

[Open Calculator ↗](#)

ex $80\text{km} = 40 \cdot 2.0\text{m}^2$



Form Factors ↗

4) Aerial Length of Basin given Form Factor ↗

fx $L_b = \frac{W_b}{F_f}$

[Open Calculator ↗](#)

ex $30m = \frac{0.24m}{0.008}$

5) Form Factor given Shape Factor ↗

fx $F_f = \frac{1}{B_s}$

[Open Calculator ↗](#)

ex $0.0008 = \frac{1}{1250}$

6) Form Factor given Width of Basin ↗

fx $F_f = \frac{W_b}{L_b}$

[Open Calculator ↗](#)

ex $0.008 = \frac{0.24m}{30m}$



7) Form Factor using Watershed Dimensions

fx $F_f = \frac{A}{L^2}$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

ex $0.008 = \frac{20m^2}{(50m)^2}$

8) Shape Factor given Watershed Length

fx $B_s = \frac{(L)^2}{A_{\text{catchment}}}$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

ex $1250 = \frac{(50m)^2}{2.0m^2}$

9) Watershed Area given Form Factor

fx $A = F_f \cdot L^2$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)

ex $20m^2 = 0.008 \cdot (50m)^2$

10) Watershed Area given Shape Factor

fx $A = \frac{L^2}{B_s}$

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b_img.jpg\)](#)

ex $2m^2 = \frac{(50m)^2}{1250}$



11) Watershed Length given Form Factor ↗

fx $L = \left(\frac{A}{F_f} \right)^{\frac{1}{2}}$

[Open Calculator ↗](#)

ex $50m = \left(\frac{20m^2}{0.008} \right)^{\frac{1}{2}}$

12) Watershed Length given Shape Factor ↗

fx $L = \sqrt{B_s \cdot A_{\text{catchment}}}$

[Open Calculator ↗](#)

ex $50m = \sqrt{1250 \cdot 2.0m^2}$

13) Width of Basin given Form Factor ↗

fx $W_b = F_f \cdot L_b$

[Open Calculator ↗](#)

ex $0.24m = 0.008 \cdot 30m$

Stream Density ↗

14) Catchment Area given Stream Density ↗

fx $A_{\text{catchment}} = \frac{N_s}{D_s}$

[Open Calculator ↗](#)

ex $2m^2 = \frac{12}{6}$



15) Length of Overland Flow ↗

fx $L_o = \left(\frac{1}{2}\right) \cdot D_s$

[Open Calculator ↗](#)

ex $3m = \left(\frac{1}{2}\right) \cdot 6$

16) Number of Streams given Stream Density ↗

fx $N_s = D_s \cdot A_{\text{catchment}}$

[Open Calculator ↗](#)

ex $12 = 6 \cdot 2.0m^2$

17) Stream Density ↗

fx $D_s = \frac{N_s}{A_{\text{catchment}}}$

[Open Calculator ↗](#)

ex $6 = \frac{12}{2.0m^2}$



Variables Used

- A Watershed Area (*Square Meter*)
- $A_{\text{catchment}}$ Catchment Area (*Square Meter*)
- B_s Shape Factor
- D_d Drainage Density
- D_s Stream Density
- F_f Form Factor
- L Watershed Length (*Meter*)
- L_b Length of Basin (*Meter*)
- L_o Length of Overland Flow (*Meter*)
- L_s Length of all Streams of Catchment (*Kilometer*)
- N_s Number of Streams
- W_b Width of Basin (*Meter*)



Constants, Functions, Measurements used

- **Function:** **sqrt**, sqrt(Number)

A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.

- **Measurement:** **Length** in Kilometer (km), Meter (m)

Length Unit Conversion 

- **Measurement:** **Area** in Square Meter (m^2)

Area Unit Conversion 



Check other formula lists

- [Runoff Density and Form Factor Formulas](#) ↗
- [Runoff Flow and Peak Algorithm Formulas](#) ↗

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