



Runoff Density and Form Factor Formulas

Calculators!

Examples!

Conversions!

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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

$$\mathbf{K} \mathbf{A}_{\mathrm{catchment}} = rac{\mathbf{L}_{\mathrm{s}}}{\mathbf{D}_{\mathrm{d}}}$$

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

 $\left| \mathrm{D_{d}} \right| = rac{\mathrm{L_{s}}}{\mathrm{A_{catchment}}}$

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

3) Length of all Streams given Drainage Density

fx
$$L_{s} = D_{d} \cdot A_{catchment}$$

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

Open Calculator

Open Calculator 2

Open Calculator



Form Factors

4) Aerial Length of Basin given Form Factor

 $egin{aligned} \mathcal{L}_{
m b} = rac{{
m W}_{
m b}}{{
m F}_{
m f}} \end{aligned}$

Open Calculator

 $\boxed{30\text{m} = \frac{0.24\text{m}}{0.008}}$

5) Form Factor given Shape Factor

 $\mathbf{F}_{\mathrm{f}} = rac{1}{\mathrm{B}_{\mathrm{s}}}$

Open Calculator

6) Form Factor given Width of Basin

 \mathbf{f} $\mathbf{F}_{\mathrm{f}} = rac{\mathbf{W}_{\mathrm{b}}}{\mathbf{L}_{\mathrm{b}}}$

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



Open Calculator 2

Open Calculator G

Open Calculator

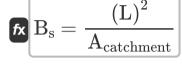
7) Form Factor using Watershed Dimensions

$$extbf{F}_{ ext{f}} = rac{ ext{A}}{ ext{L}^2}$$

Open Calculator 2

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

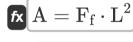
8) Shape Factor given Watershed Length



 $ag{1250} = rac{(50 ext{m})^2}{2.0 ext{m}^2}$

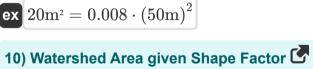












$$\mathbf{f}\mathbf{x}\mathbf{A}=rac{\mathbf{L}}{\mathbf{B}}$$

$$2 ext{m}^2 = rac{(50 ext{m})^2}{1250}$$





Open Calculator

Open Calculator 2

Open Calculator 2

Open Calculator 2

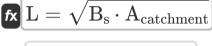
11) Watershed Length given Form Factor 💪

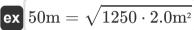


$$\left(\frac{\mathbf{A}}{\mathbf{F}_{\mathbf{f}}}\right)^{2}$$

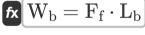
$$50 \mathrm{m} = \left(rac{20 \mathrm{m}^2}{0.008}
ight)^{rac{1}{2}}$$

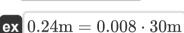
12) Watershed Length given Shape Factor





13) Width of Basin given Form Factor





Stream Density &

14) Catchment Area given Stream Density $oldsymbol{\mathcal{L}}$ $A_{catchment} = \frac{Ns}{D_s}$

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



15) Length of Overland Flow

 \mathbf{f} $\mathbf{L}_{\mathrm{o}} = \left(rac{1}{2}
ight) \cdot \mathbf{D}_{\mathrm{s}}$

Open Calculator

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

16) Number of Streams given Stream Density

 $m Ns = D_s \cdot A_{catchment}$

Open Calculator

$$\textbf{ex} \ 12 = 6 \cdot 2.0 \text{m}^{_2}$$

17) Stream Density

 $extbf{D}_{ ext{S}} = rac{ ext{Ns}}{ ext{A}_{ ext{satshment}}}$

Open Calculator

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



Variables Used

- A Watershed Area (Square Meter)
- Acatchment Catchment Area (Square Meter)
- B_s Shape Factor
- D_d Drainage Density
- D_S Stream Density
- F_f Form Factor
- L Watershed Length (Meter)
- Lb Length of Basin (Meter)
- Lo Length of Overland Flow (Meter)
- Ls Length of all Streams of Catchment (Kilometer)
- Ns 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 (m²)

 Area Unit Conversion





Check other formula lists

- Runoff Density and Form Factor
 Runoff Flow and Peak Algorithm
 Formulas
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