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# Geometrical Properties of Rectangular Channel Section Formulas

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# List of 12 Geometrical Properties of Rectangular Channel Section Formulas

## Geometrical Properties of Rectangular Channel Section

### 1) Depth of Flow given Hydraulic Radius in Rectangle

$$\text{fx } D_f = B_{\text{rect}} \cdot \frac{R_{H(\text{rect})}}{B_{\text{rect}} - 2 \cdot R_{H(\text{rect})}}$$

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b\_img.jpg\)](#)

$$\text{ex } 5.2\text{m} = 10.4\text{m} \cdot \frac{2.6\text{m}}{10.4\text{m} - 2 \cdot 2.6\text{m}}$$

### 2) Depth of Flow given Section Factor for Rectangle Channel

$$\text{fx } D_f = \left( \frac{Z_{\text{rect}}}{B_{\text{rect}}} \right)^{\frac{2}{3}}$$

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d\_img.jpg\)](#)

$$\text{ex } 5.199961\text{m} = \left( \frac{123.32\text{m}^{\wedge}2.5}{10.4\text{m}} \right)^{\frac{2}{3}}$$



### 3) Depth of Flow given Wetted Area for Rectangle

$$fx \quad D_f = \frac{A_{\text{rect}}}{B_{\text{rect}}}$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235\_img.jpg\)](#)

$$ex \quad 5.2\text{m} = \frac{54.08\text{m}^2}{10.4\text{m}}$$

### 4) Depth of Flow given Wetted Perimeter for Rectangle

$$fx \quad D_f = (P_{\text{rect}} - B_{\text{rect}}) \cdot 0.5$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0\_img.jpg\)](#)

$$ex \quad 5.2\text{m} = (20.8\text{m} - 10.4\text{m}) \cdot 0.5$$

### 5) Hydraulic Radius of Open Channel

$$fx \quad R_{H(\text{rect})} = \frac{B_{\text{rect}} \cdot D_f}{B_{\text{rect}} + 2 \cdot D_f}$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f\_img.jpg\)](#)

$$ex \quad 2.6\text{m} = \frac{10.4\text{m} \cdot 5.2\text{m}}{10.4\text{m} + 2 \cdot 5.2\text{m}}$$

### 6) Section Factor for Rectangle

$$fx \quad Z_{\text{rect}} = B_{\text{rect}} \cdot D_f^{1.5}$$

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754\_img.jpg\)](#)

$$ex \quad 123.3214\text{m}^2 \cdot 5 = 10.4\text{m} \cdot (5.2\text{m})^{1.5}$$



## 7) Wetted Area for Rectangle

$$fx \quad A_{\text{rect}} = B_{\text{rect}} \cdot D_f$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95\_img.jpg\)](#)

$$ex \quad 54.08\text{m}^2 = 10.4\text{m} \cdot 5.2\text{m}$$

## 8) Wetted Perimeter for Rectangular Section

$$fx \quad P_{\text{rect}} = B_{\text{rect}} + 2 \cdot D_f$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2\_img.jpg\)](#)

$$ex \quad 20.8\text{m} = 10.4\text{m} + 2 \cdot 5.2\text{m}$$

## 9) Width of Section given Hydraulic Radius of Rectangle

$$fx \quad B_{\text{rect}} = \frac{2 \cdot R_{H(\text{rect})} \cdot D_f}{D_f - R_{H(\text{rect})}}$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7\_img.jpg\)](#)

$$ex \quad 10.4\text{m} = \frac{2 \cdot 2.6\text{m} \cdot 5.2\text{m}}{5.2\text{m} - 2.6\text{m}}$$

## 10) Width of Section given Perimeter

$$fx \quad B_{\text{rect}} = P_{\text{rect}} - 2 \cdot D_f$$

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b\_img.jpg\)](#)

$$ex \quad 10.4\text{m} = 20.8\text{m} - 2 \cdot 5.2\text{m}$$



## 11) Width of Section given Section Factor

$$\text{fx } B_{\text{rect}} = \frac{Z_{\text{rect}}}{D_f^{1.5}}$$

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a\_img.jpg\)](#)

$$\text{ex } 10.39988\text{m} = \frac{123.32\text{m}^2}{(5.2\text{m})^{1.5}}$$

## 12) Width of Section given Wetted Areas

$$\text{fx } B_{\text{rect}} = \frac{A_{\text{rect}}}{D_f}$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021\_img.jpg\)](#)

$$\text{ex } 10.4\text{m} = \frac{54.08\text{m}^2}{5.2\text{m}}$$






## Variables Used

- $A_{\text{rect}}$  Wetted Surface Area of Rectangle (Square Meter)
- $B_{\text{rect}}$  Width of Section of Rect Channel (Meter)
- $D_f$  Depth of Flow of Channel (Meter)
- $P_{\text{rect}}$  Wetted Perimeter of Rectangle (Meter)
- $R_{H(\text{rect})}$  Hydraulic Radius of Rectangle (Meter)
- $Z_{\text{rect}}$  Section Factor of Rectangle (Meter<sup>2.5</sup>)



## Constants, Functions, Measurements used

- **Measurement: Length** in Meter (m)  
*Length Unit Conversion* 
- **Measurement: Area** in Square Meter (m<sup>2</sup>)  
*Area Unit Conversion* 
- **Measurement: Section Factor** in Meter<sup>2.5</sup> (m<sup>2.5</sup>)  
*Section Factor Unit Conversion* 



## Check other formula lists

- [Geometrical Properties of Circular Channel Section Formulas](#) 
- [Geometrical Properties of Parabolic Channel Section Formulas](#) 
- [Geometrical Properties of Rectangular Channel Section Formulas](#) 

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