Important Geometrical Properties of Triangular Channel Section Formulas PDF

Formulas
Examples
with Units

List of 17
Important Geometrical Properties of Triangular Channel Section Formulas

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1) Depth of Flow for Wetted Perimeter for Triangle Formula

Formula

$$d_{f(\Delta)} = \frac{P_{Tri}}{2 \cdot \left(\sqrt{z_{Tri}^2 + 1} \right)}$$

Example with Units

$$3.3152\,\text{m} = \frac{9.33\,\text{m}}{2 \cdot \left(\sqrt{0.99^2 + 1} \right)}$$

Evaluate Formula

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2) Depth of Flow given Hydraulic Depth for Triangle Formula

Formula

$$d_{f(\Delta)} = D_{H(\Delta)} \cdot 2$$

Example with Units

$$3.2\,\text{m} = 1.6\,\text{m} \cdot 2$$

Evaluate Formula

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3) Depth of Flow given Hydraulic Radius for Triangle Formula

Formula

$$d_{f(\Delta)} = R_{H(\Delta)} \cdot 2 \cdot \frac{\sqrt{z_{Tri}^2 + 1}}{z_{Tri}}$$

Example with Units

$$3.3175\,\text{m} = 1.167\,\text{m} \cdot 2 \cdot \frac{\sqrt{0.99^2 + 1}}{0.99}$$

Evaluate Formula

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4) Depth of Flow given Section Factor for Triangle Channel Formula

Formula

$$d_{f(\Delta)} = \left(Z_{\Delta} \cdot \frac{\sqrt{2}}{z_{Tri}} \right)^{\frac{2}{5}}$$

Example with Units

$$3.3144\,\text{m} = \left(14\,\text{m\textasciicircum2.5} \cdot \frac{\sqrt{2}}{0.99} \right)^{\frac{2}{5}}$$

Evaluate Formula

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5) Depth of Flow given Top Width for Triangle Formula

Formula

$$d_{f(\Delta)} = \frac{T_{Tri}}{2 \cdot z_{Tri}}$$

Example with Units

$$3.3333\,\text{m} = \frac{6.60001\,\text{m}}{2 \cdot 0.99}$$

Evaluate Formula

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6) Depth of Flow given Wetted Area for Triangle Formula

Formula

$$d_{f(\Delta)} = \sqrt{\dfrac{A_{Tri}}{z_{Tri}}}$$

Example with Units

$$3.3166\,\text{m} = \sqrt{\dfrac{10.89\,\text{m}^2}{0.99}}$$

7) Hydraulic Depth for Triangle Formula

Formula

$$D_{H(\Delta)} = 0.5 \cdot d_{f(\Delta)}$$

Example with Units

$$1.665\,\text{m} = 0.5 \cdot 3.33\,\text{m}$$

8) Hydraulic Radius of Flow Formula

Formula

$$R_{H(\Delta)} = \dfrac{d_{f(\Delta)} \cdot z_{Tri}}{2 \cdot \sqrt{z_{Tri}^2 + 1}}$$

Example with Units

$$1.1714\,\text{m} = \dfrac{3.33\,\text{m} \cdot 0.99}{2 \cdot \sqrt{0.99^2 + 1}}$$

9) Section Factor for Triangle Formula

Formula

$$Z_{\Delta} = \dfrac{z_{Tri} \cdot \left(d_{f(\Delta)}^{\,2.5} \right)}{\sqrt{2}}$$

Example with Units

$$14.1655\,\text{m\textasciicircum2.5} = \dfrac{0.99 \cdot \left(3.33\,\text{m}^{2.5} \right)}{\sqrt{2}}$$

10) Side Slope of Section given Hydraulic Radius Formula

Formula

$$z_{Tri} = \sqrt{\dfrac{4 \cdot \left(R_{H(\Delta)}^2 \right)}{\left(d_{f(\Delta)}^2 \right) - \left(4 \cdot R_{H(\Delta)}^2 \right)}}$$

Example with Units

$$0.9827 = \sqrt{\dfrac{4 \cdot \left(1.167\,\text{m}^2 \right)}{\left(3.33\,\text{m}^2 \right) - \left(4 \cdot 1.167\,\text{m}^2 \right)}}$$

11) Side Slope of Section given Section Factor Formula

Formula

$$z_{Tri} = \dfrac{Z_{\Delta}}{\dfrac{\left(d_{f(\Delta)}^{\,2.5} \right)}{\sqrt{2}}}$$

Example with Units

$$0.9784 = \dfrac{14\,\text{m\textasciicircum2.5}}{\dfrac{\left(3.33\,\text{m}^{2.5} \right)}{\sqrt{2}}}$$

12) Side Slope of Section given Top Width for Triangle Formula

Formula

$$z_{Tri} = \dfrac{T_{Tri}}{2 \cdot d_{f(\Delta)}}$$

Example with Units

$$0.991 = \dfrac{6.60001\,\text{m}}{2 \cdot 3.33\,\text{m}}$$

13) Side Slope of Section given Wetted Area Formula ↗

Formula

$$z_{Tri} = \frac{A_{Tri}}{d_{f(\Delta)} \cdot d_{f(\Delta)}}$$

Example with Units

$$0.9821 = \frac{10.89 \, \text{m}^2}{3.33 \, \text{m} \cdot 3.33 \, \text{m}}$$

Evaluate Formula ↗

14) Side Slope of Section given Wetted Perimeters Formula ↗

Formula

$$z_{Tri} = \sqrt{\left(\left(\frac{P_{Tri}}{2 \cdot d_{f(\Delta)}}\right)^2\right) - 1}$$

Example with Units

$$0.9811 = \sqrt{\left(\left(\frac{9.33 \, \text{m}}{2 \cdot 3.33 \, \text{m}}\right)^2\right) - 1}$$

Evaluate Formula ↗

15) Top Width for Triangle Formula ↗

Formula

$$T_{Tri} = 2 \cdot d_{f(\Delta)} \cdot z_{Tri}$$

Example with Units

$$6.5934 \, \text{m} = 2 \cdot 3.33 \, \text{m} \cdot 0.99$$

Evaluate Formula ↗

16) Wetted Area for Triangular Formula ↗

Formula

$$A_{Tri} = z_{Tri} \cdot d_{f(\Delta)}^{\,2}$$

Example with Units

$$10.978 \, \text{m}^2 = 0.99 \cdot 3.33 \, \text{m}^{\,2}$$

Evaluate Formula ↗

17) Wetted Perimeter for Triangular Section Formula ↗

Formula

$$P_{Tri} = 2 \cdot d_{f(\Delta)} \cdot \left(\sqrt{z_{Tri} \cdot z_{Tri} + 1}\right)$$

Example with Units

$$9.3717 \, \text{m} = 2 \cdot 3.33 \, \text{m} \cdot \left(\sqrt{0.99 \cdot 0.99 + 1}\right)$$

Evaluate Formula ↗

Variables used in list of Geometrical Properties of Triangular Channel Section Formulas above

- A_{Tri} Wetted Surface Area of Triangular Channel *(Square Meter)*
- $d_{f(\Delta)}$ Depth of Flow of Triangle Channel *(Meter)*
- $D_{H(\Delta)}$ Hydraulic Depth of Triangular Channel *(Meter)*
- P_{Tri} Wetted Perimeter of Triangular Channel *(Meter)*
- $R_{H(\Delta)}$ Hydraulic Radius of Triangular Channel *(Meter)*
- T_{Tri} Top Width of Triangular Channel *(Meter)*
- z_{Tri} Side Slope of Triangular Channel
- Z_{Δ} Section Factor of Triangular Channel *(Meter^2.5)*

Constants, Functions, Measurements used in list of Geometrical Properties of Triangular Channel Section Formulas above

- Functions: **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 Meter (m)
  Length Unit Conversion ➡
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion ➡
- Measurement: **Section Factor** in Meter^2.5 (m^2.5)
  Section Factor Unit Conversion ➡

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