# Important Formulas of Scalene Triangle PDF

**Formulas**
**Examples**
**with Units**

### List of 28
**Important Formulas of Scalene Triangle**

## 1) Angles of Scalene Triangle Formulas 

### 1.1) Larger Angle of Scalene Triangle Formula 

| Formula | Example with Units | Evaluate Formula |
|---|---|---|
| $\angle_{Larger} = acos\left(\dfrac{S_{Medium}{}^2 + S_{Shorter}{}^2 - S_{Longer}{}^2}{2 \cdot S_{Medium} \cdot S_{Shorter}}\right)$ | $111.8037° = acos\left(\dfrac{14\,m^2 + 10\,m^2 - 20\,m^2}{2 \cdot 14\,m \cdot 10\,m}\right)$ | |

### 1.2) Larger Angle of Scalene Triangle given other Angles Formula 

| Formula | Example with Units | Evaluate Formula |
|---|---|---|
| $\angle_{Larger} = \pi - \left(\angle_{Medium} + \angle_{Smaller}\right)$ | $110° = 3.1416 - \left(40° + 30°\right)$ | |

### 1.3) Medium Angle of Scalene Triangle Formula 

| Formula | Example with Units | Evaluate Formula |
|---|---|---|
| $\angle_{Medium} = acos\left(\dfrac{S_{Longer}{}^2 + S_{Shorter}{}^2 - S_{Medium}{}^2}{2 \cdot S_{Longer} \cdot S_{Shorter}}\right)$ | $40.5358° = acos\left(\dfrac{20\,m^2 + 10\,m^2 - 14\,m^2}{2 \cdot 20\,m \cdot 10\,m}\right)$ | |

### 1.4) Medium Angle of Scalene Triangle given Longer Side, Medium Side and Larger Angle Formula 

| Formula | Example with Units | Evaluate Formula |
|---|---|---|
| $\angle_{Medium} = asin\left(\dfrac{S_{Medium}}{S_{Longer}} \cdot sin\left(\angle_{Larger}\right)\right)$ | $41.1311° = asin\left(\dfrac{14\,m}{20\,m} \cdot sin\left(110°\right)\right)$ | |

### 1.5) Smaller Angle of Scalene Triangle Formula 

| Formula | Example with Units | Evaluate Formula |
|---|---|---|
| $\angle_{Smaller} = acos\left(\dfrac{S_{Longer}{}^2 + S_{Medium}{}^2 - S_{Shorter}{}^2}{2 \cdot S_{Longer} \cdot S_{Medium}}\right)$ | $27.6604° = acos\left(\dfrac{20\,m^2 + 14\,m^2 - 10\,m^2}{2 \cdot 20\,m \cdot 14\,m}\right)$ | |

### 1.6) Smaller Angle of Scalene Triangle given Medium Side, Shorter Side and Medium Angle Formula 

| Formula | Example with Units | Evaluate Formula |
|---|---|---|
| $\angle_{Smaller} = asin\left(\dfrac{S_{Shorter}}{S_{Medium}} \cdot sin\left(\angle_{Medium}\right)\right)$ | $27.3312° = asin\left(\dfrac{10\,m}{14\,m} \cdot sin\left(40°\right)\right)$ | |

# 2) Area of Scalene Triangle Formulas ↪

## 2.1) Area of Scalene Triangle Formula ↪

**Formula**

$$A = \sqrt{\frac{\left(S_{Longer} + S_{Medium} + S_{Shorter}\right) \cdot \left(S_{Medium} + S_{Shorter} - S_{Longer}\right) \cdot \left(S_{Longer} + S_{Shorter} - S_{Medium}\right) \cdot \left(S_{Longer} + S_{Medium} - S_{Shorter}\right)}{4}}$$

**Example with Units**

$$64.9923\,m^2 = \sqrt{\frac{\left(20\,m + 14\,m + 10\,m\right) \cdot \left(14\,m + 10\,m - 20\,m\right) \cdot \left(20\,m + 10\,m - 14\,m\right) \cdot \left(20\,m + 14\,m - 10\,m\right)}{4}}$$

## 2.2) Area of Scalene Triangle given Larger Angle and Adjacent Sides Formula ↪

**Formula**

$$A = \frac{S_{Medium} \cdot S_{Shorter} \cdot \sin\left(\angle_{Larger}\right)}{2}$$

**Example with Units**

$$65.7785\,m^2 = \frac{14\,m \cdot 10\,m \cdot \sin\left(110°\right)}{2}$$

## 2.3) Area of Scalene Triangle given Medium Angle and Adjacent Sides Formula ↪

**Formula**

$$A = \frac{S_{Longer} \cdot S_{Shorter} \cdot \sin\left(\angle_{Medium}\right)}{2}$$

**Example with Units**

$$64.2788\,m^2 = \frac{20\,m \cdot 10\,m \cdot \sin\left(40°\right)}{2}$$

## 2.4) Area of Scalene Triangle given Smaller Angle and Adjacent Sides Formula ↪

**Formula**

$$A = \frac{S_{Longer} \cdot S_{Medium} \cdot \sin\left(\angle_{Smaller}\right)}{2}$$

**Example with Units**

$$70\,m^2 = \frac{20\,m \cdot 14\,m \cdot \sin\left(30°\right)}{2}$$

# 3) Circumcircle of Scalene Triangle Formulas ↪

## 3.1) Area of Circumcircle of Scalene Triangle given Shorter Side and Smaller Angle Formula ↪

**Formula**

$$A_{Circumcircle} = \frac{\pi}{4} \cdot \left(\frac{S_{Shorter}}{\sin\left(\angle_{Smaller}\right)}\right)^2$$

**Example with Units**

$$314.1593\,m^2 = \frac{3.1416}{4} \cdot \left(\frac{10\,m}{\sin\left(30°\right)}\right)^2$$

## 3.2) Circumference of Circumcircle of Scalene Triangle given Medium Side and Medium Angle Formula ↪

**Formula**

$$C_{Circumcircle} = \pi \cdot \frac{S_{Medium}}{\sin\left(\angle_{Medium}\right)}$$

**Example with Units**

$$68.4243\,m = 3.1416 \cdot \frac{14\,m}{\sin\left(40°\right)}$$

## 3.3) Circumradius of Scalene Triangle Formula ↪

**Formula**

$$r_c = \frac{S_{Longer} \cdot S_{Medium} \cdot S_{Shorter}}{\sqrt{\left(S_{Longer} + S_{Medium} + S_{Shorter}\right) \cdot \left(S_{Longer} + S_{Medium} - S_{Shorter}\right) \cdot \left(S_{Longer} + S_{Shorter} - S_{Medium}\right) \cdot \left(S_{Medium} + S_{Shorter} - S_{Longer}\right)}}$$

**Example with Units**

$$10.7705\,m = \frac{20\,m \cdot 14\,m \cdot 10\,m}{\sqrt{\left(20\,m + 14\,m + 10\,m\right) \cdot \left(20\,m + 14\,m - 10\,m\right) \cdot \left(20\,m + 10\,m - 14\,m\right) \cdot \left(14\,m + 10\,m - 20\,m\right)}}$$

### 3.4) Circumradius of Scalene Triangle given Longer Side and Larger Angle Formula ↪

Formula

$$r_c = \frac{S_{Longer}}{2 \cdot \sin\left(\angle_{Larger}\right)}$$

Example with Units

$$10.6418\,m = \frac{20\,m}{2 \cdot \sin\left(110°\right)}$$

Evaluate Formula ↪

## 4) Heights of Scalene Triangle Formulas ↪

### 4.1) Height on Longer Side of Scalene Triangle given Medium Side and Smaller Angle Formula ↪

Formula

$$h_{Longer} = S_{Medium} \cdot \sin\left(\angle_{Smaller}\right)$$

Example with Units

$$7\,m = 14\,m \cdot \sin\left(30°\right)$$

Evaluate Formula ↪

### 4.2) Height on Medium Side of Scalene Triangle given Shorter Side and Larger Angle Formula ↪

Formula

$$h_{Medium} = S_{Shorter} \cdot \sin\left(\angle_{Larger}\right)$$

Example with Units

$$9.3969\,m = 10\,m \cdot \sin\left(110°\right)$$

Evaluate Formula ↪

### 4.3) Height on Shorter Side of Scalene Triangle given Longer Side and Medium Angle Formula ↪

Formula

$$h_{Shorter} = S_{Longer} \cdot \sin\left(\angle_{Medium}\right)$$

Example with Units

$$12.8558\,m = 20\,m \cdot \sin\left(40°\right)$$

Evaluate Formula ↪

## 5) Medians of Scalene Triangle Formulas ↪

### 5.1) Median on Longer Side of Scalene Triangle given Three Sides Formula ↪

Formula

$$M_{Longer} = \frac{\sqrt{2 \cdot \left(S_{Medium}^2 + S_{Shorter}^2\right) - S_{Longer}^2}}{2}$$

Example with Units

$$6.9282\,m = \frac{\sqrt{2 \cdot \left(14\,m^2 + 10\,m^2\right) - 20\,m^2}}{2}$$

Evaluate Formula ↪

### 5.2) Median on Medium Side of Scalene Triangle given Three Sides Formula ↪

Formula

$$M_{Medium} = \frac{\sqrt{2 \cdot \left(S_{Longer}^2 + S_{Shorter}^2\right) - S_{Medium}^2}}{2}$$

Example with Units

$$14.1774\,m = \frac{\sqrt{2 \cdot \left(20\,m^2 + 10\,m^2\right) - 14\,m^2}}{2}$$

Evaluate Formula ↪

### 5.3) Median on Shorter Side of Scalene Triangle given Three Sides Formula ↪

Formula

$$M_{Shorter} = \frac{\sqrt{2 \cdot \left(S_{Longer}^2 + S_{Medium}^2\right) - S_{Shorter}^2}}{2}$$

Example with Units

$$16.5227\,m = \frac{\sqrt{2 \cdot \left(20\,m^2 + 14\,m^2\right) - 10\,m^2}}{2}$$

Evaluate Formula ↪

## 6) Other Formulas of Scalene Triangle Formulas ↪

### 6.1) Inradius of Scalene Triangle by Heron's Formula Formula ↪

Formula

$$r_i = \sqrt{\frac{\left(s - S_{Longer}\right) \cdot \left(s - S_{Medium}\right) \cdot \left(s - S_{Shorter}\right)}{s}}$$

Example with Units

$$2.9542\,m = \sqrt{\frac{\left(22\,m - 20\,m\right) \cdot \left(22\,m - 14\,m\right) \cdot \left(22\,m - 10\,m\right)}{22\,m}}$$

Evaluate Formula ↪

### 6.2) Perimeter of Scalene Triangle Formula 

**Formula**

$$P = S_{Longer} + S_{Medium} + S_{Shorter}$$

**Example with Units**

$$44_m = 20_m + 14_m + 10_m$$

Evaluate Formula 

# 7) Sides of Scalene Triangle Formulas 

### 7.1) Longer Side of Scalene Triangle given Larger Angle and other Sides Formula 

Evaluate Formula 

**Formula**

$$S_{Longer} = \sqrt{S_{Medium}^2 + S_{Shorter}^2 - 2 \cdot S_{Medium} \cdot S_{Shorter} \cdot \cos\left(\angle_{Larger}\right)}$$

**Example with Units**

$$19.7931_m = \sqrt{14_m^2 + 10_m^2 - 2 \cdot 14_m \cdot 10_m \cdot \cos\left(110°\right)}$$

### 7.2) Longer Side of Scalene Triangle given Larger Angle, Medium Angle and Medium Side Formula 

Evaluate Formula 

**Formula**

$$S_{Longer} = S_{Medium} \cdot \frac{\sin\left(\angle_{Larger}\right)}{\sin\left(\angle_{Medium}\right)}$$

**Example with Units**

$$20.4666_m = 14_m \cdot \frac{\sin\left(110°\right)}{\sin\left(40°\right)}$$

### 7.3) Medium Side of Scalene Triangle given Medium Angle and other Sides Formula 

Evaluate Formula 

**Formula**

$$S_{Medium} = \sqrt{S_{Longer}^2 + S_{Shorter}^2 - 2 \cdot S_{Longer} \cdot S_{Shorter} \cdot \cos\left(\angle_{Medium}\right)}$$

**Example with Units**

$$13.9134_m = \sqrt{20_m^2 + 10_m^2 - 2 \cdot 20_m \cdot 10_m \cdot \cos\left(40°\right)}$$

### 7.4) Medium Side of Scalene Triangle given Medium Angle, Smaller Angle and Shorter Side Formula 

Evaluate Formula 

**Formula**

$$S_{Medium} = S_{Shorter} \cdot \frac{\sin\left(\angle_{Medium}\right)}{\sin\left(\angle_{Smaller}\right)}$$

**Example with Units**

$$12.8558_m = 10_m \cdot \frac{\sin\left(40°\right)}{\sin\left(30°\right)}$$

### 7.5) Shorter Side of Scalene Triangle given Smaller Angle and other Sides Formula 

Evaluate Formula 

**Formula**

$$S_{Shorter} = \sqrt{S_{Longer}^2 + S_{Medium}^2 - 2 \cdot S_{Longer} \cdot S_{Medium} \cdot \cos\left(\angle_{Smaller}\right)}$$

**Example with Units**

$$10.5369_m = \sqrt{20_m^2 + 14_m^2 - 2 \cdot 20_m \cdot 14_m \cdot \cos\left(30°\right)}$$

### 7.6) Shorter Side of Scalene Triangle given Smaller Angle, Larger Angle and Longer Side Formula 

Evaluate Formula 

**Formula**

$$S_{Shorter} = S_{Longer} \cdot \frac{\sin\left(\angle_{Smaller}\right)}{\sin\left(\angle_{Larger}\right)}$$

**Example with Units**

$$10.6418_m = 20_m \cdot \frac{\sin\left(30°\right)}{\sin\left(110°\right)}$$

## Variables used in list of Important Formulas of Scalene Triangle above

- $\angle_{Larger}$ Larger Angle of Scalene Triangle *(Degree)*
- $\angle_{Medium}$ Medium Angle of Scalene Triangle *(Degree)*
- $\angle_{Smaller}$ Smaller Angle of Scalene Triangle *(Degree)*
- $A$ Area of Scalene Triangle *(Square Meter)*
- $A_{Circumcircle}$ Area of Circumcircle of Scalene Triangle *(Square Meter)*
- $C_{Circumcircle}$ Circumference of Circumcircle of Scalene Triangle *(Meter)*
- $h_{Longer}$ Height on Longer Side of Scalene Triangle *(Meter)*
- $h_{Medium}$ Height on Medium Side of Scalene Triangle *(Meter)*
- $h_{Shorter}$ Height on Shorter Side of Scalene Triangle *(Meter)*
- $M_{Longer}$ Median on Longer Side of Scalene Triangle *(Meter)*
- $M_{Medium}$ Median on Medium Side of Scalene Triangle *(Meter)*
- $M_{Shorter}$ Median on Shorter Side of Scalene Triangle *(Meter)*
- $P$ Perimeter of Scalene Triangle *(Meter)*
- $r_c$ Circumradius of Scalene Triangle *(Meter)*
- $r_i$ Inradius of Scalene Triangle *(Meter)*
- $s$ Semiperimeter of Scalene Triangle *(Meter)*
- $S_{Longer}$ Longer Side of Scalene Triangle *(Meter)*
- $S_{Medium}$ Medium Side of Scalene Triangle *(Meter)*
- $S_{Shorter}$ Shorter Side of Scalene Triangle *(Meter)*

## Constants, Functions, Measurements used in list of Important Formulas of Scalene Triangle above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- Functions: **acos**, acos(Number) *The inverse cosine function, is the inverse function of the cosine function. It is the function that takes a ratio as an input and returns the angle whose cosine is equal to that ratio.*
- Functions: **asin**, asin(Number) *The inverse sine function, is a trigonometric function that takes a ratio of two sides of a right triangle and outputs the angle opposite the side with the given ratio.*
- Functions: **cos**, cos(Angle) *Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.*
- Functions: **sin**, sin(Angle) *Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.*
- 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: **Angle** in Degree (°) *Angle Unit Conversion*

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