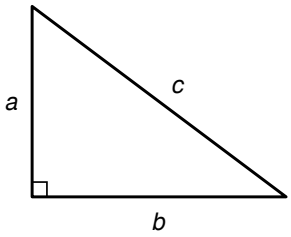
Right Triangle Formula Sheet

Right Triangle Calculators



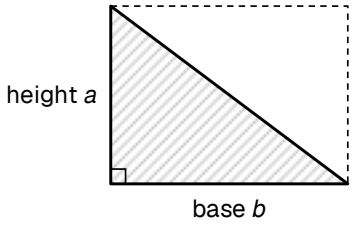
1 Pythagorean theorem

$$a^2 + b^2 = c^2$$

Legs a and b meet at the right angle. The hypotenuse c is opposite it.

Hypotenuse: $c = \sqrt{(a^2 + b^2)}$ Legs: $a = \sqrt{(c^2 - b^2)}$, $b = \sqrt{(c^2 - a^2)}$

Example: $a = 6$, $b = 8 \rightarrow c = \sqrt{(36 + 64)} = \sqrt{100} = 10$

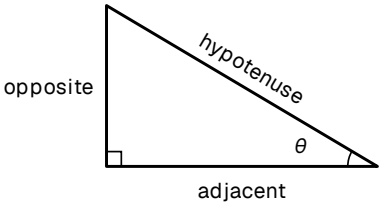


2 Area

$$A = \tfrac{1}{2} \times a \times b$$

The legs are the base and the height, so the triangle is half an $a \times b$ rectangle.

Example: $a = 6$, $b = 8 \rightarrow A = \tfrac{1}{2} \times 6 \times 8 = 24$

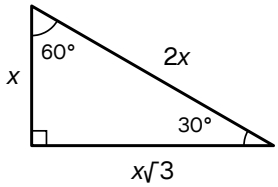


3 SOH-CAH-TOA

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} \qquad \cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} \qquad \tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$

To find the angle, use the inverse: $\theta = \sin^{-1}(\text{opposite} \div \text{hypotenuse})$.

Example: opposite 6, hypotenuse 10 → $\sin\theta = 0.6$, so $\theta = \sin^{-1}(0.6) \approx 36.87°$



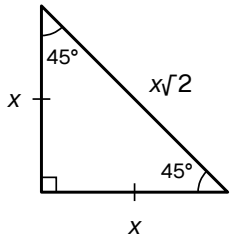
4 30-60-90 triangle

$$1 : \sqrt{3} : 2$$ short leg : long leg : hypotenuse

Long leg = short leg × $\sqrt{3}$ Hypotenuse = 2 × short leg

Short leg = hypotenuse ÷ 2 = long leg ÷ $\sqrt{3}$

Example: short leg 5 → long leg $5\sqrt{3} \approx 8.66$, hypotenuse $2 \times 5 = 10$

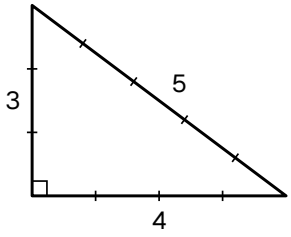


5 45-45-90 triangle

$$1 : 1 : \sqrt{2}$$ leg : leg : hypotenuse

The two legs are equal. Hypotenuse = leg × $\sqrt{2}$ Leg = hypotenuse ÷ $\sqrt{2}$

Example: leg 4 → hypotenuse $4\sqrt{2} \approx 5.66$



6 Common Pythagorean triples

3, 4, 5	5, 12, 13	8, 15, 17	7, 24, 25
9 + 16 = 25	25 + 144 = 169	64 + 225 = 289	49 + 576 = 625

Whole numbers that fit $a^2 + b^2 = c^2$. Multiples fit too: 6, 8, 10 and 9, 12, 15.

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