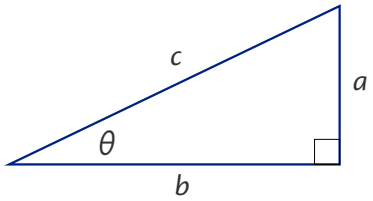
Trigonometric Functions (*"SohCahToa"*)



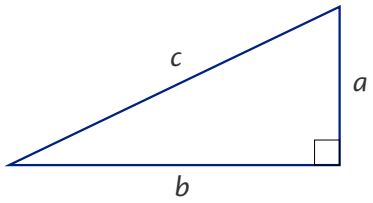
$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{a}{c}$$

$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{b}{c}$$

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}} = \frac{a}{b}$$

Triangles

Pythagorean Theorem and Friends



Right triangle: $c^2 = a^2 + b^2$

Obtuse triangle: $c^2 > a^2 + b^2$

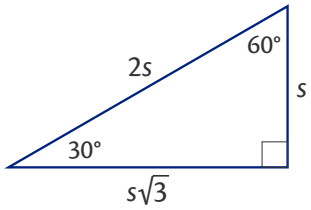
Acute triangle: $c^2 < a^2 + b^2$

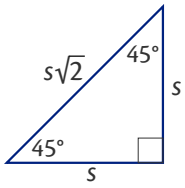
Seriously, memorize these; they'll keep showing up the rest of your math career.

Pythagorean Triplets

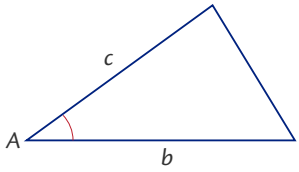
- 3-4-5
- 5-12-13
- 7-24-25

Special Triangles

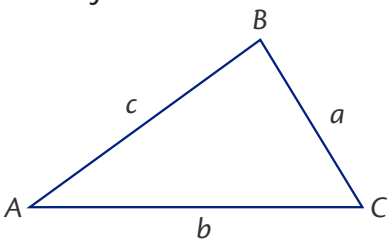




Area of an Arbitrary Triangle

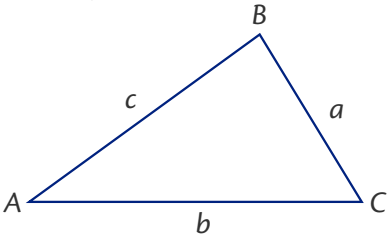


Law of Sines



$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Law of Cosines

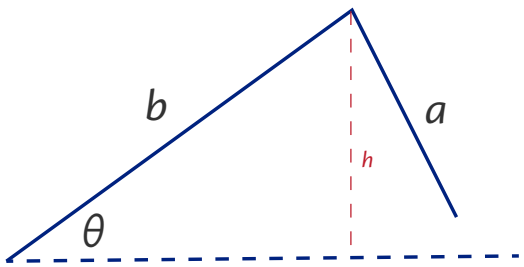


$$a^2 = b^2 + c^2 - 2bc\cos(A)$$

Law of Sines, Ambiguous Case

Number of possible triangles

Given a triangle in which you know angle-side-side, as at right.



- Calculate $h = b \sin \theta$

  Note that b is the side adjacent to the angle

- Compare h and a (the far side)

$h > a$	No triangle
$h = a$	One triangle (no ambiguity)
$h > a$	Possibly two triangles