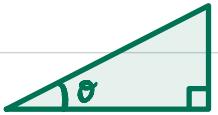
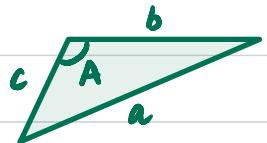


Trigonometry : Year 1

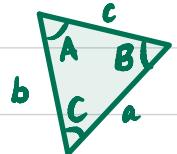
Definitions



Cosine Rule

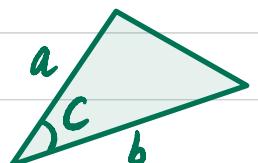


Sine Rule

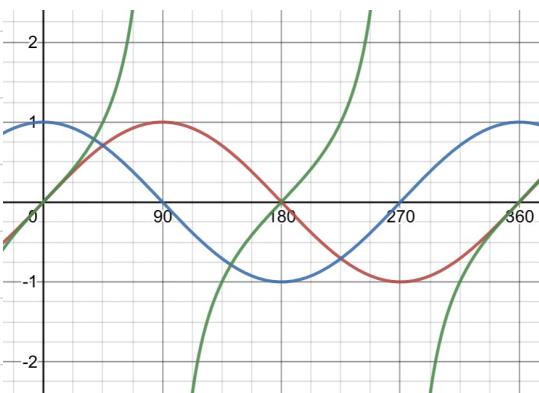


Ambiguous case:

Area of a Triangle:



Graphs



Exact Values

$$\sin 0^\circ =$$

$$\cos 0^\circ =$$

$$\tan 0^\circ =$$

$$\sin 90^\circ =$$

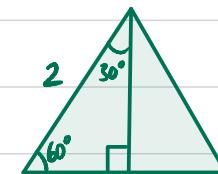
$$\cos 90^\circ =$$

$$\tan 90^\circ =$$

$$\sin 45^\circ =$$

$$\cos 45^\circ =$$

$$\tan 45^\circ =$$



$$\sin 30^\circ =$$

$$\cos 30^\circ =$$

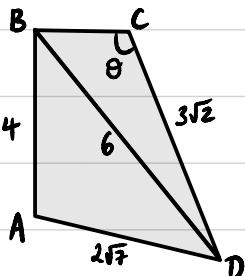
$$\tan 30^\circ =$$

$$\sin 60^\circ =$$

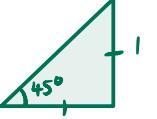
$$\cos 60^\circ =$$

$$\tan 60^\circ =$$

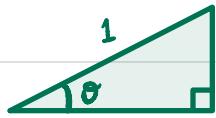
Example Problem



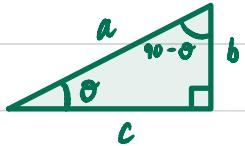
Given that $\angle ABC$ is a right angle and θ is obtuse,
find θ



More Definitions



Co-function Identity



Solving Equations

$$\sin \theta \dots \theta \quad \left. \right\}$$

$$\cos \theta \dots \theta \quad \left. \right\}$$

$$\tan \theta \dots \theta \quad \left. \right\}$$

e.g. $\sin \theta = 0.6$ (Give answers to nearest degree)
 $\theta = 37^\circ$

Equations with Linear Input e.g. Solve for $0^\circ < x < 90^\circ$, $\tan(2x - 20^\circ) = -0.4$

- 1) Change the range
- 2) Solve for new range first
- 3) Solve these for x, θ , etc.

Example Problem

a) Show that $\frac{10\sin^2 \theta - 7\sin(90 - \theta) + 2}{3 + 2\cos \theta} \equiv 4 - 5\cos \theta$

b) Hence, solve for $-180^\circ \leq x \leq 180^\circ$

$$\frac{10\sin^2 2x - 7\sin(90 - 2x) + 2}{3 + 2\cos 2x} = 6\cos^2 2x$$

Trigonometry : Year 2

Radians

$$\pi \rightarrow 180^\circ$$

$$2\pi \rightarrow$$

$$\frac{\pi}{2} \rightarrow$$

$$\frac{2\pi}{3} \rightarrow$$

etc.

Small Angle Approximations

$$\sin \theta \approx$$

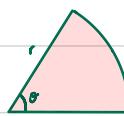
$$\cos \theta \approx$$

$$\tan \theta \approx$$

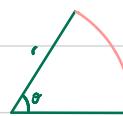
e.g. Given that θ is small,
find the approximate value of

$$\frac{1 - \cos \theta}{\theta \tan \theta} =$$

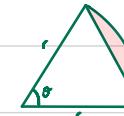
Sectors, Arcs + Segments



Sector Area

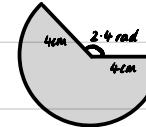


Arc Length



Segment Area

e.g. Find the area and perimeter of :



Pythagorean Identities

$$\sin^2 \theta + \cos^2 \theta = 1$$

Even more definitions

$$\sec \theta = \frac{1}{\cos \theta} =$$

$$\csc \theta = \frac{1}{\sin \theta} =$$

$$\cot \theta = \frac{1}{\tan \theta} =$$

e.g. Simplify

$$\frac{3 \sec \theta \sin \theta \tan \theta}{2 \cos \theta \cot \theta \csc \theta}$$

Addition Formulae

$$\sin(A \pm B) =$$

$$\cos(A \pm B) =$$

$$\tan(A \pm B) =$$

Double Angle Formulae

$$\sin 2\theta =$$

$$\cos 2\theta =$$

=

=

e.g. Simplify $8 \sin x \cos x \cos 2x$

$$\tan 2\theta =$$

Harmonic Identities

"Express $a \sin \theta + b \cos \theta$ in the

form $R \cos(\theta \pm \alpha)$ or $R \sin(\theta \pm \alpha)$ "

Example Problems

1a) Express $3\cos\theta + 4\sin\theta$ in the form
 $R\sin(\theta+\alpha)$

2a) Prove that $\cosec 2\theta - \cot 2\theta \equiv \tan\theta$

1b) Hence, find the minimum and maximum values of

$$\frac{4}{(3\cos\theta + 4\sin\theta)^2 + 1}$$

2b) Hence, solve for $-\pi < y \leq \pi$

$$(\cosec 2y - \cot 2y)^2 = \sec y + 1$$