Trigonometric Equations 10

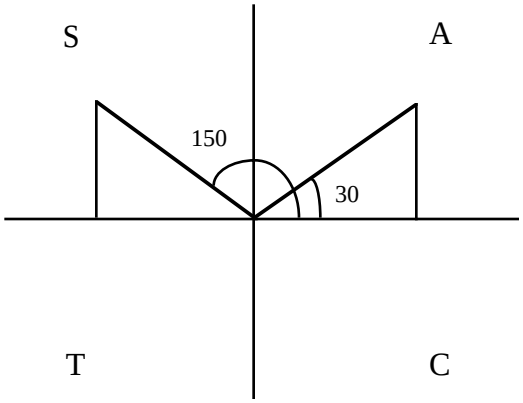
Many equations which we must solve, contain one or more of the trig functions.

Example 1:

Solve the equation; $2\sin x = 1$ for $0 \leq x < 360$

$\sin x = 0.5$ $x = 30°, 150°$.

We solve this by using our calculator. But the calculator gives only 30°. We can infer the other answer(s) by drawing a grid with similar triangles and by making use of the CAST rule.



The CAST rule says that **cos** is (+) in the fourth quadrant, **all** trig functions are (+) in the first quadrant, **sin** is (+) in the second quadrant, and **tan** is (+) in the third quadrant.

Example 2:

Solve the equation; $\tan^2 x = 1$ for $0 \leq x < 360$

$\tan x = \pm 1$ $x = 45°, 135°, 225°, 315°$.

Problems:

1) Solve the following equations for $0 \leq x < 360$.

a) $\sin x = 1$ b) $\sin^2 x = 1$ c) $2\cos x = 1$

d) $\tan x = 1$ e) $\tan x = -1$ f) $4\sin^2 x = 3$

g) $3\tan x = \sqrt{3}$ h) $\cos^2 x = 1$ i) $2\sin x = -1$

j) $4\cos^2 x = 3$ k) $\csc^2 x = 2$ l) $\cos x = 2$

m) $\sin(2x) = 1$ n) $\csc x - \sin x = 0$ o) $\sin^2 x = 3\cos^2 x$

Answers: 1)a) 90°, b) 90°, 270°, c) 60°, 300°, d) 45°, 225°, e) 135°, 315°, f) 60°, 120°, 240°, 300°, g) 30°, 210°, h) 0°, 180°, i) 210°, 330°, j) 30°, 150°, 210°, 330°, k) 45°, 135°, 225°, 315°, l) no solution, m) 45°, 225°, n) 90°, 270°, o) 60°, 120°, 240°, 300°.