

Further Trigonometry

Type 3.

Example 5:

$$4 \sin x - 3 \cos x = 0$$

Re-arrange equation to give

$$4 \sin x = 3 \cos x$$

$$\tan x = 3/4 \quad \text{dividing both sides by } \cos x$$

$$\tan x = 0.75$$

Use 2nd function **tan** on the calculator

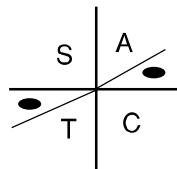
$$x = \tan^{-1} 0.75$$

$$x = 36.9^\circ$$

The tangent is positive in 1st and 3rd quadrant

Solutions are: $x = 36.9^\circ$ **$x = 36.9^\circ$**

$x = 180 + 36.9^\circ$ **$x = 216.9^\circ$**



We use the fact here that:

$$\tan x = \frac{\sin x}{\cos x}$$

Useful relationships

$$\tan A = \frac{\sin A}{\cos A}$$

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

Further Trigonometry

Type 2.

Example 3:

$$4 \sin x + 3 = 0$$

Re-arrange equation to give

$$4 \sin x = -3$$

$$\sin x = -3/4$$

$$\sin x = -0.75$$

Use 2nd function **sin** on the calculator

$$x = \sin^{-1} 0.75$$

ignore the negative sign for the moment

$$x = 48.6^\circ$$

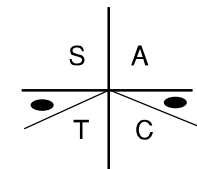
Note that $\sin x$ is negative ($= -0.75$)

Use ASTC

The sine is negative in 3rd and 4th quadrant

Solutions are: $x = 180 + 48.6^\circ$ **$x = 228.6^\circ$**

$x = 360 - 48.6^\circ$ **$x = 311.4^\circ$**



Example 4:

$$3 \tan x + 1 = 0$$

Re-arrange equation to give

$$3 \tan x = -1$$

$$\tan x = -1/3$$

$$\tan x = -0.333$$

Use 2nd function **tan** on the calculator

$$x = \tan^{-1} 0.333$$

ignore the negative sign for the moment

$$x = 18.4^\circ$$

The tangent is negative in 2nd and 4th quadrant

Solutions are: $x = 180 - 18.4^\circ$ **$x = 161.6^\circ$**

$x = 360 - 18.4^\circ$ **$x = 341.6^\circ$**

