Solving TRIgonometric Equations → using "u substitution"

Example 1

$4\sin^2\theta + 4\sin\theta + 1 = 0$

↓

$4u^2 + 4u + 1 = 0$

1) set u = function

$u = \sin\theta$

A·C
4 · 1
4
factor
add up to
B?
^
2, 2

$(4u^2 + 2u) + (2u + 1) = 0$

$2u(2u+1)\ 1(2u+1)$

$(2u+1)(2u+1)$

2) Factor the trinomial

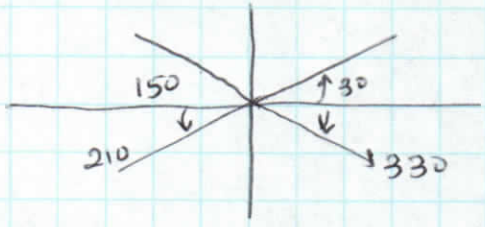
S	A
T	C

3) Set up your table to solve and "undo the u!"

$2u+1=0$	$2u+1=0$
$\frac{2}{2}\sin\theta + 1 = 0$ $-1\ -1$ $\sin\theta = -\frac{1}{2}$ Sin is neg in Q_3 and Q_4	same, nothing to solve here RA = 30

Solutions Q_3 $\theta = 210°$

Q_4 $\theta = 330°$



Example 2

$2\cos^2 x + 3\cos x - 2 = 0$

$u = \cos x$

$2u^2 + 3u - 2 = 0$

-4

$-1 \cdot 4 = 3$

$-4 \cdot 1 = -3$

$-2 \cdot 2 = 0$

$(2u^2 - u) + (4u - 2) = 0$

$u(2u - 1) \; 2(2u - 1) = 0$

$(2u - 1)(u + 2) = 0$

$2u - 1 = 0$	$u + 2 = 0$
$2\cos x - 1 = 0$	$\cos x + 2 = 0$
$\cos x = \frac{1}{2}$	$\cos x = \frac{-2}{1}$
$\theta = 60°$	If $\cos = \frac{adj}{hyp}$ DNE
$\theta = 300°$	Does not exist //

Example 3 (Homework)

$2\cos^2 x + 1 = -3\cos x$

$+3\cos x \quad +3\cos x$

$2\cos^2 x + 3\cos x + 1 = 0$