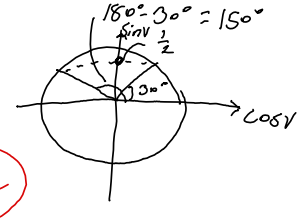
Trigonometriska ekvationer

Vi vill lösa tre ekvationer med olika vinkar

Sinusekvationer $\sin v = \frac{1}{2}$



$v_1 = 30°$

$v_2 = 150°$

Sen har sin v en period på 360° grader! För samtliga lösningar

$v_1 = 30° + 360° \cdot n$

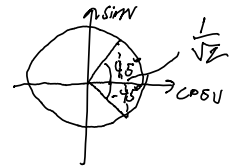
$v_2 = 150° + 360° \cdot n$

Generell lösning $\sin v = c$

$v_1 = v + 360° \cdot n$ $\quad v = \arcsin c$

$v_2 = (180° - v) + 360° \cdot n$ $\quad n$ = heltal

Cosinusekvationer $\cos v = \frac{1}{\sqrt{2}}$



$v_1 = 45° + 360° \cdot n$

$v_2 = -45° + 360° \cdot n$

Samma period som sin 360°

Generell lösning $\cos v = c$

$v_1 = v + 360° \cdot n$ $\quad v = \arccos c$

$v_2 = -v + 360° \cdot n$ $\quad n$ = heltal

Generell lösning $\tan v = c$

$v_1 = v + 180° \cdot n$ $\quad v = \arctan c$

n = heltal

Notera period på 180°

Bestäm samtliga lösningar till ekvationerna

a) $2\cos v = 1$

$\cos v = \frac{1}{2}$

$\arccos \frac{1}{2} = 60°$

$v_1 = 60° + 360° \cdot n$

$v_2 = -60° + 360° \cdot n$

b) $4 \sin v = 3$ $\quad \arcsin \frac{3}{4} \approx 49°$

$v_1 = 49° + 360° \cdot n$

$v_2 = 180 - 49° + 360° \cdot n = 131° + 360° \cdot n$

c) $\sin 2x = \frac{\sqrt{3}}{2}$ $\arcsin \frac{\sqrt{3}}{2} = 60°$

Fall 1:

$2x = 60° + 360° \cdot n$

$x_1 = 30° + 180° \cdot n$

Fall 2:

$2x = 180° - 60° + 360° \cdot n$

$2x = 120° + 360° \cdot n$

$x_2 = 60° + 180° \cdot n$

d) $\tan 3x = 3$ $\arctan 3 \approx 72°$

$3x = 72° + 180° \cdot n$

$x = 24° + 60° \cdot n$

e) $\cos(x + 30°) = \frac{1}{3}$ $\arccos \frac{1}{3} \approx 71°$

$x_1 + 30° = 71° + 360° \cdot n$

$x_1 = 41° + 360° \cdot n$

$x_2 + 30° = -71° + 360° \cdot n$

$x_2 = -101° + 360° \cdot n$