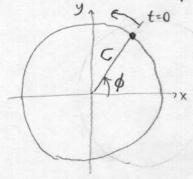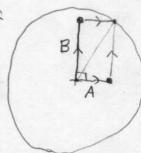A) [Warm-up!] Solve for all values of time t when signal $\sin(3t+5)$ crosses zero (vanishes):
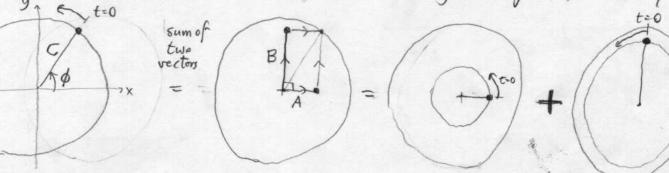
B) Consider a point on radius C circle starting at angle ϕ, ie $\theta = \phi + t$

$y = \cdots$

⎰ what is its y-coord?

sum of two vectors

$= \cdots$

what are A, B in terms of C, ϕ?

$= \cdots$

$y = \cdots$

what is y-coord of just this rotating vector?

$+$

⎰ what is y-coord of just this rotating vector? (hint: not sin!)

Equate the two ways of writing y:

If you were given A, B, how would you get C, ϕ ?

Substitute $\begin{cases} t = a \\ \phi = b \end{cases}$ to write an **addition formula** for $\sin(a+b)$: