CONCEPT: PHASORS FOR INDCUTORS
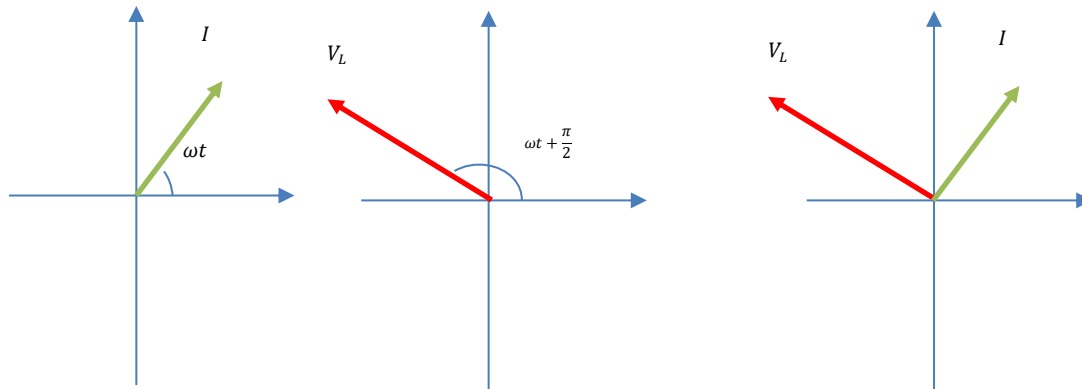
● Remember! The voltage and current across an inductor at any time t is

- $i(t) = i_{MAX} \cos(\omega t)$

- $v_L(t) = i_{MAX} X_L \cos\left(\omega t + \frac{\pi}{2}\right)$

● Because both cosines have a DIFFERENT angle, they are said to be OUT OF PHASE – The current LAGS the voltage
   - This is reflected in their phasors:

● Voltage across an inductor LEADS the current

EXAMPLE: An AC source is connected to an inductor. At a particular instant in time, the current in the circuit is negative and increasing in magnitude. Draw the phasors for voltage and current that correspond to this instant in time.

PRACITCE: PHASORS IN A INDUCTOR CIRCUIT

An AC source operates at a maximum voltage of 75 V and is connected to a 0.4 H inductor. If the current across the inductor is $i(t) = i_{MAX} \cos[(450 \ s^{-1})t]$,

a) What is i_{MAX}?

b) Draw the phasors for voltage across the inductor and current in the circuit at $t = 4.2 \ ms$. Assume that the current phasor begins at $0°$.