Consider the following continuous time signal,

\[ x_a(t) = \cos(10 \cdot 2\pi t + \theta). \]

Because the frequency is \( F = 10 \) cycles per time unit, the Nyquist rate is 20 samples per time unit. Suppose that we sample at a lower rate, \( F_s = 15 \) samples per time unit, which is below the Nyquist rate and will lead to aliasing. Keeping in mind that the time when we take sample \( n \) is \( t = n/F_s = n/15 \),

\[
x(n) = x_a(t = n/15) = \cos \left( 10 \cdot 2\pi \frac{n}{15} + \theta \right)
= \cos \left( \frac{2}{3} \cdot 2\pi n + \theta \right)
= \cos \left( \left( -\frac{1}{3} \right) \cdot 2\pi n + \theta \right)
= \cos \left( \left( +\frac{1}{3} \right) \cdot 2\pi n - \theta \right).
\]

An interesting point to notice is that the sign of the phase shift \( \theta \) got flipped in the last line.

But what if the continuous time input signal was a sine instead of a cosine? In that case, the input signal would be

\[ x_a(t) = \sin(10 \cdot 2\pi t + \theta), \]

and the sampled signal would be

\[
x(n) = x_a(t = n/15) = \sin \left( 10 \cdot 2\pi \frac{n}{15} + \theta \right).
= \sin \left( \frac{2}{3} \cdot 2\pi n + \theta \right).
= \sin \left( \left( -\frac{1}{3} \right) \cdot 2\pi n + \theta \right)
= -\sin \left( \left( +\frac{1}{3} \right) \cdot 2\pi n - \theta \right).
\]
Note that there are now two negative signs. The first is ahead of the phase shift $\theta$, as before. But the sign of the entire expression has become negative.