Phase difference: $\delta \equiv \varphi_{p_1} - \varphi_{p_2}$	$\cos\delta$	Resultant Amplitude: p_{ToT}
0^o	$+1$	$p_1 + p_2$
45^o	$+\frac{1}{\sqrt{2}}$	$\sqrt{p_1^2 + p_2^2 + \sqrt{2}p_1 p_2}$
90^o	0	$\sqrt{p_1^2 + p_2^2}$
135^o	$-\frac{1}{\sqrt{2}}$	$\sqrt{p_1^2 + p_2^2 - \sqrt{2}p_1 p_2}$
180^o	-1	$p_1 - p_2$
225^o	$-\frac{1}{\sqrt{2}}$	$\sqrt{p_1^2 + p_2^2 - \sqrt{2}p_1 p_2}$
270^o	0	$\sqrt{p_1^2 + p_2^2}$
315^o	$+\frac{1}{\sqrt{2}}$	$\sqrt{p_1^2 + p_2^2 + \sqrt{2}p_1 p_2}$
360^o	$+1$	$p_1 + p_2$

If have *N* sources of ***correlated*** sounds, then simply have to work out the phasor diagram for *N* individual phase-related amplitude components to obtain resultant/overall total amplitude.

The sound intensity $|I_{ToT}| \propto |p_{ToT}|^2$ The (magnitude) of the sound intensity, I is proportional to the square of the (magnitude) of the total/net *RMS* over-pressure amplitude, $|p|^2$.

For a "free-field" sound situation, the corresponding SPL and/or SIL for each entry in the above table can be computed using:

$$SPL = L_p \equiv 10\log_{10}\left(\frac{p_{tot}^2}{p_o^2}\right) = 10\log_{10}\left(\frac{p_{tot}}{p_o}\right)^2 = 20\log_{10}\left(\frac{p_{tot}}{p_o}\right) \quad (dB)$$

$$\simeq SIL = L_I \equiv 10\log_{10}\left(\frac{I_{tot}}{I_o}\right)$$