$$\begin{cases} 1)\ \sin(\alpha+\beta) = \sin\alpha\cos\beta + \sin\beta\cos\alpha \\ 2)\ \sin(\alpha-\beta) = \sin\alpha\cos\beta - \sin\beta\cos\alpha \end{cases}$$

$+$

$$\sin(\alpha+\beta) + \sin(\alpha-\beta) = \sin\alpha\cos\beta + \cancel{\sin\beta\cos\alpha} + \sin\alpha\cos\beta - \cancel{\sin\beta\cos\alpha}$$

$$\boxed{\sin(\alpha+\beta)+\sin(\alpha-\beta) = 2\sin\alpha\cos\beta}$$

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$$\boxed{\begin{cases} \alpha+\beta = x \\ \alpha-\beta = y \end{cases}} \Rightarrow \boxed{\sin x + \sin y = 2\sin\frac{x+y}{2}\cos\frac{x-y}{2}}$$

$+$

$2\alpha = x+y$

$$\boxed{\alpha = \frac{x+y}{2}}$$

$-$

$2\beta = x-y$

$$\beta = \frac{x-y}{2}$$

$$\sin x + \sin y = 2\sin\frac{x+y}{2}\cos\frac{x-y}{2}$$

$$\cancel{2\sin 30^\circ = \sin 60^\circ}$$

$$2\sqrt{x} = \sqrt{2^2\cdot x}$$

$$\begin{cases} x+y = 5 = \alpha \\ x-y = 8 = \beta \end{cases}$$

$$x = \frac{\alpha+\beta}{2} = 6,5$$

$$y = \frac{\alpha-\beta}{2} = -1,5$$

$\sin(-x) = -\sin x$

$\cos(-x) = \cos x$

$tg(-x) = -tg\, x$

$ctg(-x) = -ctg\, x$

$$\boxed{\sin x + \sin y = 2\sin\frac{x+y}{2}\cos\frac{x-y}{2}}$$

$$\sin x - \sin y = \sin x + \sin(-y) = 2\sin\frac{x+(-y)}{2}\cdot\cos\frac{x+y}{2}$$

$$\sin x - \sin y = 2\cos\frac{x+y}{2}\cdot\sin\frac{x-y}{2}$$

$\cos x + \cos y =$

$\cos x + \cos y =$

$$\boxed{\begin{cases}\cos(\alpha+\beta) = \cos\alpha\cos\beta - \cancel{\sin\alpha\sin\beta}\\ \cos(\alpha-\beta) = \cos\alpha\cos\beta + \cancel{\sin\alpha\sin\beta}\end{cases}}\ +$$

$$\cos(\alpha+\beta)+\cos(\alpha-\beta) = 2\cos\alpha\cos\beta$$

$$\begin{cases}\alpha+\beta = x\\ \alpha-\beta = y\end{cases}\ +$$

$$2\alpha = x+y$$

$$\alpha = \frac{x+y}{2}$$

$$\begin{cases}\alpha+\beta = x\\ \alpha-\beta = y\end{cases}\ -$$

$$2\beta = x-y$$

$$\beta = \frac{x-y}{2}$$

$$\cos x + \cos y = 2\cos\frac{x+y}{2}\cos\frac{x-y}{2}$$

$$\boxed{+\begin{cases}\cos(\alpha+\beta) = \cos\alpha\cancel{\cos\beta} - \sin\alpha\cancel{\sin\beta} \\ \cos(\alpha-\beta) = \cos\alpha\cancel{\cos\beta} + \sin\alpha\cancel{\sin\beta}\end{cases}}$$

$$\cos(\alpha+\beta) - \cos(\alpha-\beta) = -2\sin\alpha\sin\beta$$

$$\cos x - \cos y = -2\sin\frac{x+y}{2}\sin\frac{x-y}{2}$$

$$\sin 75^\circ = \sin(45^\circ+30^\circ) =$$

$$\sin 30\cdot\cos 45 + \cos 30\cdot\sin 45^\circ = \frac{1}{2}\cdot\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2} = \frac{\sqrt{2}+\sqrt{6}}{4}$$

$$\boxed{\operatorname{tg} 15^\circ} = \operatorname{tg}(45^\circ-30^\circ) = \frac{\sin(45-30^\circ)}{\cos(45^\circ-30^\circ)} =$$

$$\frac{\sin 45\cdot\cos 30 - \cos 45\cdot\sin 30}{\cos 45\cos 30 + \sin 45\cdot\sin 30} = \frac{\cancel{\frac{\sqrt{2}}{2}}\cdot\frac{\sqrt{3}}{\cancel{2}} - \cancel{\frac{\sqrt{2}}{2}}\cdot\frac{1}{\cancel{2}}}{\cancel{\frac{\sqrt{2}}{2}}\cdot\frac{\sqrt{3}}{\cancel{2}} + \cancel{\frac{\sqrt{2}}{2}}\cdot\frac{1}{\cancel{2}}} = \frac{\sqrt{3}-1}{\sqrt{3}+1} =$$

$$= \frac{(\sqrt{3}-1)^2}{3-1} = \frac{3-2\sqrt{3}+1}{2} = 2-\sqrt{3}$$

$$\boxed{\operatorname{tg}\frac{\alpha}{2} = \frac{1-\cos\alpha}{\sin\alpha}}$$

$$\operatorname{tg}15^\circ = \frac{1-\cos 30^\circ}{\sin 30^\circ} = \frac{1-\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \boxed{2-\sqrt{3}}$$

$$\beta$$

$$\frac{1-\cos\alpha}{\sin\alpha} = \frac{1-\cos 2\left(\frac{\alpha}{2}\right)}{\sin 2\cdot\frac{\alpha}{2}} = \frac{1-\cos 2\beta}{\sin 2\beta} =$$

$$\frac{1-\cos^2\beta+\sin^2\beta}{2\sin\beta\cos\beta} = \frac{\cancel{2}\sin^{\cancel{2}}\beta}{\cancel{2}\cancel{\sin}\beta\cos\beta} = \frac{\sin\beta}{\cos\beta} = \operatorname{tg}\beta$$