The Additional Formulae:

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- $\sin(A+B)$ and $\sin(A-B)$

For any two angles, A and B, (A+B) and (A−B) are known as COMPOUND ANGLES.

In general, $\sin(A \pm B) \neq \sin A \pm \sin B$

$\sin(A+B) = \sin A \cos B + \cos A \sin B$
$\sin(A-B) = \sin A \cos B - \cos A \sin B$

Pythagoras Theorem $a^2 + b^2 = c^2$. $c = \sqrt{a^2+b^2}$

$\cos(A+B) = \cos A \cos B - \sin A \sin B$
$\cos(A-B) = \cos A \cos B + \sin A \sin B$

$\tan(A+B) = \dfrac{\tan A + \tan B}{1 - \tan A \tan B}$

$\tan(A-B) = \dfrac{\tan A - \tan B}{1 + \tan A \tan B}$

The Double Angle Formulae

$\sin 2A = 2 \sin A \cos A$

$\cos 2A = \cos^2 A - \sin^2 A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$

$\tan 2A = \dfrac{2\tan A}{1 - \tan^2 A}$

The R-Formulae

☆ let $a > 0$ and $b > 0$

$a\sin\theta \pm b\cos\theta = R\sin(\theta \pm \alpha)$

$a\cos\theta \pm b\sin\theta = R\cos(\theta \mp \alpha)$

$\left.\begin{array}{l} -1 \leq \sin A \leq 1 \\ -1 \leq \cos A \leq 1 \end{array}\right\}$ $\begin{array}{l} -R \leq R\sin(\theta \pm \alpha) \leq R \\ -R \leq R\cos(\theta \pm \alpha) \leq R \end{array}$

where $R = \sqrt{a^2+b^2}$ and $\tan\alpha = \dfrac{b}{a}$ (α is acute)

Other formulae:

$\left.\begin{array}{l} \operatorname{cosec}\theta = \dfrac{1}{\sin\theta} \\ \sec\theta = \dfrac{1}{\cos\theta} \\ \cot\theta = \dfrac{1}{\tan\theta} \end{array}\right\}$ Reciprocals

$\left.\begin{array}{l} \tan\theta = \dfrac{\sin\theta}{\cos\theta} \\ \cot\theta = \dfrac{\cos\theta}{\sin\theta} \end{array}\right\}$ Ratio identities

$\left.\begin{array}{l} \sin^2\theta + \cos^2\theta = 1 \\ 1 + \tan^2\theta = \sec^2\theta \\ 1 + \cot^2\theta = \operatorname{cosec}^2\theta \end{array}\right\}$ Pythagorean identities