

זווית משולשת:

$$\sin 3\alpha = 3\sin \alpha - 4\sin^3 \alpha = \sin \alpha (2\cos \alpha + 1)(2\cos \alpha - 1)$$

$$\cos 3\alpha = 4\cos^3 \alpha - 3\cos \alpha = \cos \alpha (1 + 2\sin \alpha)(1 - 2\sin \alpha)$$

$$\tan 3\alpha = \frac{3\tan \alpha - \tan^3 \alpha}{1 - 3\tan^2 \alpha}$$

סכום והפרש פונקציות:

$$\sin \alpha + \sin \beta = 2\sin \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2}$$

$$\sin \alpha - \sin \beta = 2\sin \frac{\alpha - \beta}{2} \cos \frac{\alpha + \beta}{2}$$

$$\cos \alpha + \cos \beta = 2\cos \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2}$$

$$\cos \alpha - \cos \beta = -2\sin \frac{\alpha + \beta}{2} \sin \frac{\alpha - \beta}{2}$$

$$\tan \alpha \pm \tan \beta = \frac{\sin(\alpha \pm \beta)}{\cos \alpha \cos \beta}$$

$$\cot \alpha \pm \cot \beta = \frac{\sin(\beta \pm \alpha)}{\sin \alpha \sin \beta}$$

מכפלת פונקציות:

$$\sin \alpha \cos \beta = \frac{1}{2}[\sin(\alpha + \beta) + \sin(\alpha - \beta)]$$

$$\cos \alpha \sin \beta = \frac{1}{2}[\sin(\alpha + \beta) - \sin(\alpha - \beta)]$$

$$\cos \alpha \cos \beta = \frac{1}{2}[\cos(\alpha - \beta) + \cos(\alpha + \beta)]$$

$$\sin \alpha \sin \beta = \frac{1}{2}[\cos(\alpha - \beta) - \cos(\alpha + \beta)]$$

הפרש וסכום ריבועים:

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

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

$$\sin^2 \alpha + \sin^2 \beta = 1 - \cos(\alpha + \beta)\cos(\alpha - \beta)$$

$$\cos^2 \alpha + \cos^2 \beta = 1 + \cos(\alpha + \beta)\cos(\alpha - \beta)$$

משפט הסינוסים:

$$\frac{a}{\sin \alpha} = \frac{b}{\sin \beta} = \frac{c}{\sin \gamma} = 2R$$

משפט הקוסינוסים:

$$c^2 = a^2 + b^2 - 2ab \cos \gamma$$

זהויות טריגונומטריות

הזהויות היסודיות:

$$\sin \theta = \cos(90^\circ - \theta)$$

$$\tan \theta = \cot(90^\circ - \theta)$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\tan \theta \cdot \cot \theta = 1$$

$$1 + \tan^2 \theta = \frac{1}{\cos^2 \theta}$$

$$1 + \cot^2 \theta = \frac{1}{\sin^2 \theta}$$

סכום והפרש זוויות:

$$\sin(\alpha \pm \beta) = \sin \alpha \cos \beta \pm \cos \alpha \sin \beta$$

$$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \mp \sin \alpha \sin \beta$$

$$\tan(\alpha \pm \beta) = \frac{\tan \alpha \pm \tan \beta}{1 \mp \tan \alpha \tan \beta}$$

$$\cot(\alpha \pm \beta) = \frac{\cot \alpha \cot \beta \mp 1}{\cot \beta \pm \cot \alpha}$$

זווית כפולה:

$$\sin 2\alpha = 2\sin \alpha \cos \alpha$$

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

$$\tan 2\alpha = \frac{2\tan \alpha}{1 - \tan^2 \alpha}$$

$$\cot 2\alpha = \frac{\cot^2 \alpha - 1}{2\cot \alpha}$$

חצי זווית:

$$\sin \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \cos \alpha}{2}}$$

$$\cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$

$$\tan \frac{\alpha}{2} = \frac{1 - \cos \alpha}{\sin \alpha} = \frac{\sin \alpha}{1 + \cos \alpha}$$

$$\tan^2 \frac{\alpha}{2} = \frac{1 - \cos \alpha}{1 + \cos \alpha}$$