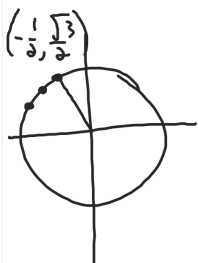


Monday - November 3, 2014

⑩ b)  $\sin 405^\circ + \sin 120^\circ$

$$\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}$$

$$\frac{\sqrt{2} + \sqrt{3}}{2}$$

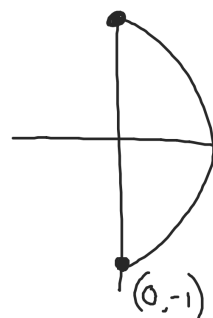


⑥①  $\sin\left[\frac{\pi}{2} + \sin^{-1}(-1)\right]$

$$\sin\left[\frac{\pi}{2} - \frac{\pi}{2}\right]$$

$$\sin[0]$$

$$0$$

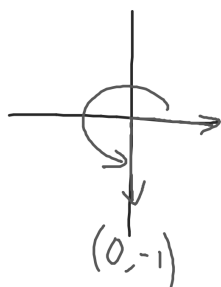


⑥③  $\cos(\pi + \sin^{-1}(1))$

$$\cos\left(\pi + \frac{\pi}{2}\right)$$

$$\cos\left(\frac{3\pi}{2}\right)$$

$$0$$



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## Double Angle

$$\sin(2x) = 2 \sin x \cos x$$

$$\cos(2x) = \cos^2 x - \sin^2 x$$

$$= 2 \cos^2 x - 1$$

$$= 1 - 2 \sin^2 x$$

$$\tan(2x) = \frac{2 \tan x}{1 - \tan^2 x}$$

Solve

$$2 \cos x + \sin 2x = 0$$

$$2 \cos x + 2 \sin x \cos x = 0$$

$$2 \cos x (1 + \sin x) = 0$$

$$2 \cos x = 0 \quad | \quad 1 + \sin x = 0$$

$$\cos x = 0$$

$$\sin x = -1$$

$$x = \frac{\pi}{2} + \pi n$$

$$x = \frac{3\pi}{2} + 2\pi n$$

$$x^2 + 3x = 0$$

$$x(x+3) = 0$$

$$x = 0 \quad x + 3 = 0$$

$$x = -3$$



## Power Reducing

$$\sin^2 x = \frac{1 - \cos 2x}{2}$$

$$\cos^2 x = \frac{1 + \cos 2x}{2}$$

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

## Half-Angle

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

based on where  $\frac{x}{2}$  lies in unit circle.

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

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

Eval.

$$\sin 105^\circ$$

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

$$= \sqrt{\frac{1 - \cos 210^\circ}{2}}$$

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

(+, +)

$(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$

$$= \sqrt{\frac{2 + \sqrt{3}}{4}}$$

Product to Sum Formulas  
P. 388

Sum to Product Formulas  
P. 388