

A
20

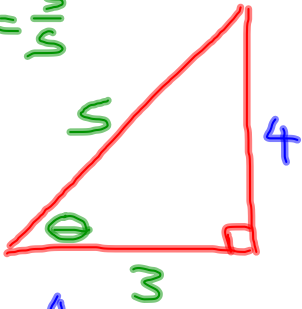
$$\sin\left(2\cos^{-1}\frac{3}{5}\right)$$

$$\sin 2\theta = 2 \sin\theta \cos\theta$$

$$= 2\left(\frac{4}{5}\right)\left(\frac{3}{5}\right)$$

$$= \frac{24}{25}$$

$\cos^{-1}\frac{3}{5} = \theta$
 $\cos\theta = \frac{3}{5}$



$\sin\theta = \frac{4}{5}$

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

⊕ because 7.5° in I

$$\cos 7.5^\circ = \sqrt{\frac{1+\cos 15^\circ}{2}}$$

$$= \sqrt{\frac{1+\sqrt{\frac{1+\cos 30^\circ}{2}}}{2}}$$

$\theta = 15^\circ, \frac{15^\circ}{2} = 7.5^\circ$
 $\theta' = 30^\circ, \frac{30^\circ}{2} = 15^\circ$

$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$= \sqrt{\frac{1+\sqrt{\frac{1+\frac{\sqrt{3}}{2}}{2}}}{2}}$$

$$= \sqrt{\frac{1+\sqrt{\frac{2+\sqrt{3}}{4}}}{2}} = \sqrt{\frac{1+\frac{1}{2}\sqrt{2+\sqrt{3}}}{2}} = \sqrt{\frac{1+\sqrt{2+\sqrt{3}}}{4}}$$

$$= \frac{1}{2}\sqrt{1+\sqrt{2+\sqrt{3}}}$$

$\frac{c}{2\theta}$ $\sin 11.25^\circ =$ $\theta = 22.5^\circ, \frac{22.5^\circ}{2} = 11.25^\circ$

$\sin \frac{\theta}{2} = \pm \sqrt{\frac{1 - \cos \theta}{2}}$ $\oplus 11.25^\circ$ is in I

$\sin 11.25^\circ = \sqrt{\frac{1 - \cos 22.5^\circ}{2}}$ $\theta' = 45^\circ, \frac{45^\circ}{2} = 22.5^\circ$

$= \sqrt{\frac{1 - \sqrt{\frac{1 + \cos 45^\circ}{2}}}{2}}$ $\cos 45^\circ = \frac{\sqrt{2}}{2}$

$= \sqrt{\frac{1 - \sqrt{\frac{1 + \sqrt{2}}{2}}}{2}} \cdot \frac{2}{2} = \sqrt{\frac{1 - \sqrt{\frac{2 + \sqrt{2}}{4}}}{2}}$

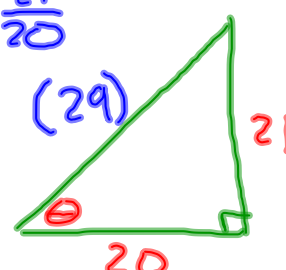
$\frac{20}{21}$ $\cos(2 \tan^{-1} \frac{21}{20})$ $\tan^{-1} \frac{21}{20} = \theta$

$\cos 2\theta = \cos^2 \theta - \sin^2 \theta$ $\tan \theta = \frac{21}{20}$

$= (\frac{20}{29})^2 - (\frac{21}{29})^2$

$= \frac{400}{841} - \frac{441}{841}$

$= \frac{-41}{841}$



$\cos \theta = \frac{A}{H} = \frac{20}{29}$

$\sin \theta = \frac{O}{H} = \frac{21}{29}$