Double + Half Angle Identities

$$\cos 2A = \cos(A+A) = \cos A\cos A - \sin A \sin A$$

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

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

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

Look at the quadrant where $\frac{B}{2}$ is located.

$$\cos B = 2\cos^2\left(\frac{B}{2}\right) - 1$$

$$\sqrt{\frac{\cos B + 1}{2}} = \sqrt{\cos^2\left(\frac{B}{2}\right)}$$

$$\pm\sqrt{\frac{1+\cos B}{2}} = \cos\left(\frac{B}{2}\right)$$

$$\cos\left(\frac{B}{2}\right) = \pm\sqrt{\frac{1+\cos B}{2}}$$

$$\sin\left(\frac{B}{2}\right) = \pm\sqrt{\frac{1-\cos B}{2}}$$

$$\tan\left(\frac{B}{2}\right) = \pm\sqrt{\frac{1-\cos B}{1+\cos B}}$$
$$= \frac{1-\cos B}{\sin B} \quad *$$
$$= \frac{\sin B}{1+\cos B}$$

T or F

T $\cos 50^\circ = 1 - 2\sin^2 25$
$= \cos(2 \cdot 25^\circ)$
$= \cos 50^\circ$

F $\sin 42^\circ = 2\sin 84^\circ \cos 84^\circ$
$= \sin(2 \cdot 84^\circ)$
$= \sin 168^\circ$

Evaluate.

$$\frac{2\tan 75^\circ}{1 - \tan^2 75^\circ} = \tan(2 \cdot 75^\circ) = \tan 150^\circ = -\frac{\sqrt{3}}{3}$$

T-F

F $\cos 130^\circ = \sqrt{\frac{1-\cos 260^\circ}{2}}$

$= \sin\left(\frac{260^\circ}{2}\right)$

$\cos 194^\circ = -\sqrt{\frac{1+\cos 388^\circ}{2}}$

$\cos\left(\frac{388^\circ}{2}\right)$

$\cos 194^\circ$

3rd

False

Evaluate $\frac{1-\cos 450^\circ}{\sin 450^\circ} = \tan\left(\frac{450^\circ}{2}\right) = \tan 225^\circ$

$= +1$

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Find $\cos 2A$ given $\csc A = -\frac{7}{3}\frac{r}{y}$ + $\frac{3\pi}{2} < A < 2\pi$

IV

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

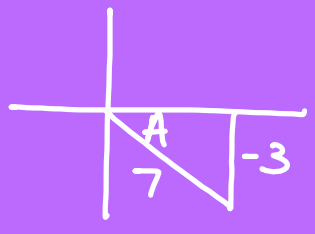
$= 1 - 2\left(\frac{y}{r}\right)^2$

$= 1 - 2\left(\frac{-3}{7}\right)^2$

$= 1 - 2\left(\frac{9}{49}\right)$

$= 1 - \frac{18}{49}$

$= \frac{49}{49} - \frac{18}{49} = \boxed{\frac{31}{49}}$



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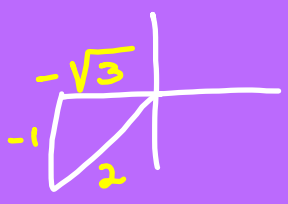
Find $\cos\frac{A}{2}$ given $\sin A = -\frac{1}{2}$ & A in QIII

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



$x^2+(-1)^2=2^2$

$x^2+1=4$

$\sqrt{x^2}=\sqrt{3}$

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

$$= -\sqrt{\frac{\frac{2-\sqrt{3}}{2}}{2}\cdot\frac{1}{2}}$$

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

$$= -\frac{\sqrt{2-\sqrt{3}}}{2}$$

$180° < A < 270°$

$90° < \frac{A}{2} < 135°$

QII

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

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

$$\frac{2\sin x\cos x}{2\sin^2 x}$$

$$\frac{\cos x}{\sin x} = \frac{\cos x}{\sin x}$$

1) Select the identity that makes "1's" cancel
2) Look at the opposite side

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

1) Pick the identity that makes 1's cancel

2) Look at opposite to choose