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B 13. If $\cos\alpha = -\frac{1}{4}$ and $\sin\alpha < 0$, then find the value of $\cos\frac{\alpha}{2}$ if α is within $[0, 2\pi)$

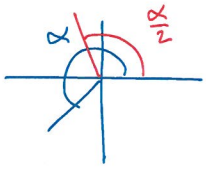
a. $-\frac{\sqrt{6}}{8}$

b. $-\frac{\sqrt{6}}{4}$

c. $\frac{\sqrt{3}}{4}$

d. $-\frac{\sqrt{3}}{3}$

e. $\sqrt{\frac{3}{8}}$



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

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

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

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

$= -\sqrt{\frac{3}{8}\cdot\frac{\sqrt{2}}{\sqrt{2}}}$

$= -\frac{\sqrt{6}}{4}$

15. Solve: $\cos 2x - 2 = 3\sin x$ for $0 \le x < 2\pi$.

$(1-2\sin^2 x) - 2 = 3\sin x$

$2\sin^2 x + 3\sin x + 1 = 0$

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

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

$x = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{3\pi}{2}$

FREE RESPONSE

14. Verify the identity: $\frac{\sin^2 x}{1-\cos x} = 1 + \cos x$

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

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

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

$= 1 + \cos x$ //

16. Verify

$\ln|\tan\theta| = \ln|\sin\theta| - \ln|\cos\theta|$

$= \frac{\ln|\sin\theta|}{\ln|\cos\theta|}$

$= \ln|\tan\theta|$