In Class Problem

Smearing and Side Lobe interference

Given: $x[n] = 2\cos(0.3\pi n) + 0.04\cos(0.39\pi n)$
$N = 64$

Question: Would you choose a rect, bartlett, hann, hamming or blackman window to resolve these two frequencies?

Remember:
Φ is the normalized discrete radian frequency
ML is the main lobe width of the window
SLL is the Side Lobe Level of the window
A_1 and A_2 are the amplitudes of the sinusoids

Smearing occurs if $|\Phi_1 - \Phi_2| < ML / 2$
SLL interference occurs if $SLL > 20\log_{10}(A_1/A_2)$ on the window where $|\Phi_1 - \Phi_2|$

First find $|\Phi_1 - \Phi_2| =$ _____

Calc $20\log_{10}(A_1/A_2) =$ _____

Complete Table, eliminate possibilities to pick best window

	ML/2	SLL	SLL @ $\lvert\Phi_1 - \Phi_2\rvert$ (look at figure)
rect			
bartlett			
hann			
hamming			
blackman			