Solutions for lab 4

Exercise 1
Narrowband (100,20 - long window, over 2 periods) has better frequency resolution but poor time resolution (x blur)

Wideband (40,5) has better time resolution but poorer frequency resolution (y-blur).
Exercise 2
Vowels differ between first 3 formants. See Lab1 and Lab2 – exercises with the PRAAT.

Exercise 3 – nasals (“mono”)

spectrogram(snd,Fs,20,2,5000)

Difference with "n" and "m" is visible at the picture. “n” has some extra high formant (~3000 Hz) due to touching teeth with tongue, which changes vocal tract geometry.
Exercise 4 - fricatives ("vote, for")

Time domain important for unvoiced fricatives - notice noise as at the picture.

For voiced both important, look at the beginning - bottom very low frequency harmonics structure due to oscillating vocal folds.
Exercise 5 - plosives ("beep","data")

Time domain important only, observe burst and aspirations.