Help file for assignment 4
Semitones: part 1

To transpose a note one semitone up, multiply the frequency by 2**(1/12):
`new_freq = freq * 2**(1/12)`

To transpose a note two semitones up, transpose once and then transpose again.
`new_freq = freq * 2**(1/12) * 2**(1/12)`

This can be simplified as follows
`new_freq = freq * 2**(1/12 + 1/12)` which is
`new_freq = freq * 2**(2/12)`

Therefore, when a transposition by two semitones up is requested, your code should have something equivalent to the following:
`new_freq = freq * 2**(2/12)`

Attempt to generalize this. If you get stuck the solution is in the next page.

To transpose down, note that
`new_freq = freq / 2**(1/12)`
is the same as
`new_freq = freq * 2**(-1/12)`

Using the same logic we used before, transposing two semitones down becomes
`new_freq = freq * 2**(-1/12) * 2**(-1/12)` which is equivalent to
`new_freq = freq * 2**(-2/12)`

Attempt to generalize this. If you get stuck the solution is in the next page.

Semitones: part 2

The general solution to transpose n semitones is
`new_freq = freq * 2**(n/12)`
Try to figure out why.

This should work for positive and for negative numbers. The positive numbers correspond to transposition up while the negative numbers correspond to transposition down.