PROBLEM:

The intention of the following MATLAB program is to synthesize a sinusoid that could be played out through a D/A converter. The synthesis is done by using a recursive (feedback) filter, implemented via MATLAB's `filter` function.

```
imp = [ 1, zeros(1,9999)];
bb = [0   1   0];
aa = [1  -1.9  1];
xn = filter( bb, aa, imp );
```

(a) Determine the poles of the synthesis filter.

(b) Determine a formula for $x[n]$, the signal contained in the vector `xn`. This formula should give numerical values for the amplitude, phase and frequency of $x[n]$.

(c) If this signal is played out through a D-A converter with $f_s = 8$ kHz, what frequency (in Hertz) will be heard?