2. Indicate whether the following statements are true or false. If the statement is true, give a brief justification. If the statement is false, give a simple counter example or a clear reason.

   a) If a real-coefficient digital filter has a zero-phase frequency response, then it must be a non-causal filter.

   True.

   b) All periodic continuous-time signals will remain periodic after sampling.

   False. The sampled signal is periodic only if the ratio of the period of the original signal and the sampling period is a rational number.

   c) If a z-transform doesn't have a region of convergence on the Z-plane, then its time-domain sequence doesn't exist.

   False. Many time-domain sequences don't have a ROC in their Z-transform.

   d) The sum of the impulse responses of two minimum-phase filters is always the impulse response of another minimum-phase filter.

   False. The sum of the impulses responses will have a transfer function that is the sum of the transfer functions of the two original impulse responses. The poles of this transfer function will remain the same. The zeros of this transfer function, however, will not be the same and may move out of the unit circle.

   e) If N samples of the discrete-time Fourier transform of a discrete-time sequence $h(n)$ are taken at $2\pi k/N$, where $k=0,\ldots,N-1$, then this set of samples represents the N-point discrete-Fourier transform of $h(n)$.

   False. The N samples of the DTFT of $h(n)$ are the DFT of the "aliased" $h(n)$.