... 1.40. (2)

c) From part (a), can you conclude that if the input to a linear system is zero between times t_1 and t_2 (continuous time) or n_1 and n_2 (discrete time), then its output is zero between those times?

No. Consider the discrete-time system that transforms a signal $x[n]$ into $y[n] = x[n-1]$.

Linearity check:

$x'[n] = \alpha x_1[n] + \beta x_2[n] \Rightarrow y'[n] = x'[n-1] = \alpha x_1[n-1] + \beta x_2[n-1]$

$\alpha y_1[n] + \beta y_2[n] = \alpha x_1[n-1] + \beta x_2[n-1] = y'[n] \Rightarrow$ linear

Consider $x[n] = \delta[n]$: $x[n] = 0 \quad \forall\ n \in (-\infty, -1] \cup [1, +\infty)$

$y[n] = \delta[n-1] \Rightarrow y[+1] = \delta[1-1] = \delta[0] = 1 \neq 0$

~~$\Rightarrow y[n] = 0 \quad \forall\ n \in \{n \in \mathbb{Z} : n-1 \neq 0\}$~~

$x[n]$ is 0 between 1 and 2, but $y[n]$ is not 0 at 1.