Prob. 1.20 (change of notation)

Given: system is linear and

$x_1(t) = e^{j2t} \rightarrow \boxed{S} \rightarrow y_1(t) = e^{j3t}$

$x_2(t) = e^{-j2t} \rightarrow \boxed{S} \rightarrow y_2(t) = e^{-j3t}$

(a) $x(t) = \cos(2t)$

$= \underbrace{\frac{1}{2}}_{a_1} \underbrace{e^{j2t}}_{x_1(t)} + \underbrace{\frac{1}{2}}_{a_2} \underbrace{e^{-j2t}}_{x_2(t)} \rightarrow \boxed{S} \rightarrow y(t) = ?$

(b) $x(t-\frac{1}{2}) = \cos(2(t-\frac{1}{2}))$

$= \underbrace{\frac{1}{2}e^{-j}}_{a_1} \underbrace{e^{j2t}}_{x_1(t)} + \underbrace{\frac{1}{2}e^{j}}_{a_2} \underbrace{e^{-j2t}}_{x_2(t)} \rightarrow \boxed{S} \rightarrow z(t) = ?$

If you were told system was TI: $z(t) = y(t-\frac{1}{2})$

but it turns out system is not TI