Choosing $f_c = \frac{f_1 + f_2}{2} = 10.025$ kHz,

and $W = \frac{f_2 - f_1}{2} = 0.025$ kHz,

we have $f_1 = f_c - W$ and $f_2 = f_c + W$,

Hence $x(t) = \frac{1}{4} \cos(2\pi(f_c - W)t + \pi/4)$

$+ \sin(2\pi(f_c + W)t + \pi/3)$

$= \frac{1}{4} \mathrm{Re}\left(e^{j(2\pi(f_c - W)t + \pi/4)}\right)$

$+ \mathrm{Re}\left(-j e^{j(2\pi(f_c + W)t + \pi/3)}\right)$

$= \mathrm{Re}\left(\left[\frac{1}{4} e^{j(-2\pi W t + \pi/4)} - j e^{j(2\pi W t + \pi/3)}\right] e^{j2\pi f_c t}\right)$

$= \mathrm{Re}\left(\tilde{x}(t) e^{j2\pi f_c t}\right)$, and

~~there~~ fore

$\tilde{x}(t) = \frac{1}{4} e^{j(-2\pi W t + \pi/4)} - j e^{j(2\pi W t + \pi/3)}$

$= \frac{1}{4} e^{j(-\frac{\pi t}{20} + \pi/4)} - j e^{j(\frac{\pi t}{20} + \pi/3)}$