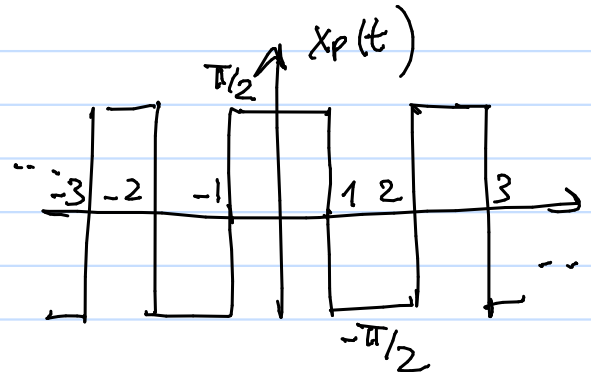
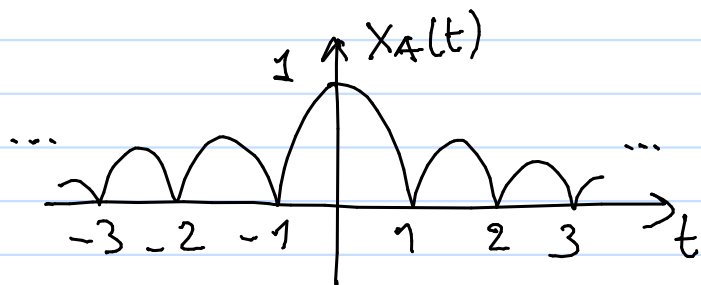


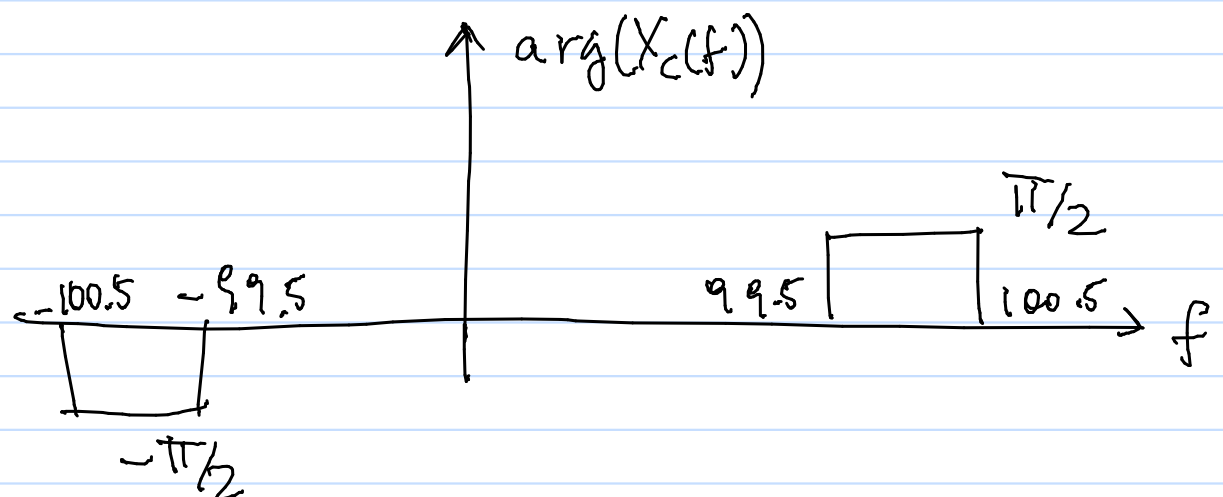
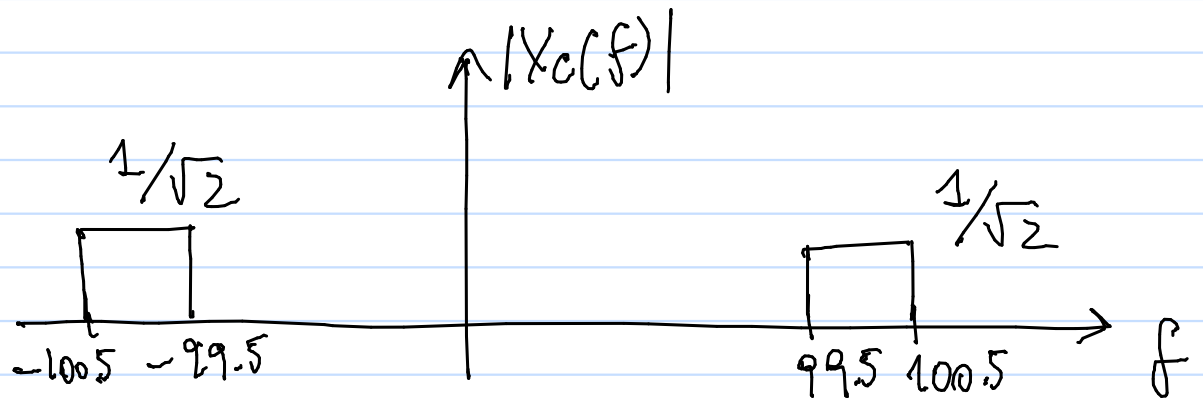
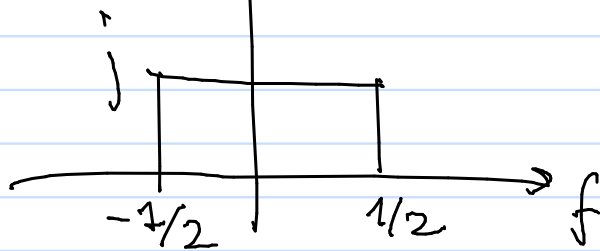
1. a.  $x_c(t) = -\sqrt{2} \text{sinc}(t) \sin(2\pi 100t) \Leftrightarrow X_z(t) = j X_a(t)$

b.  $X_A(t) = |\text{sinc}(t)|$

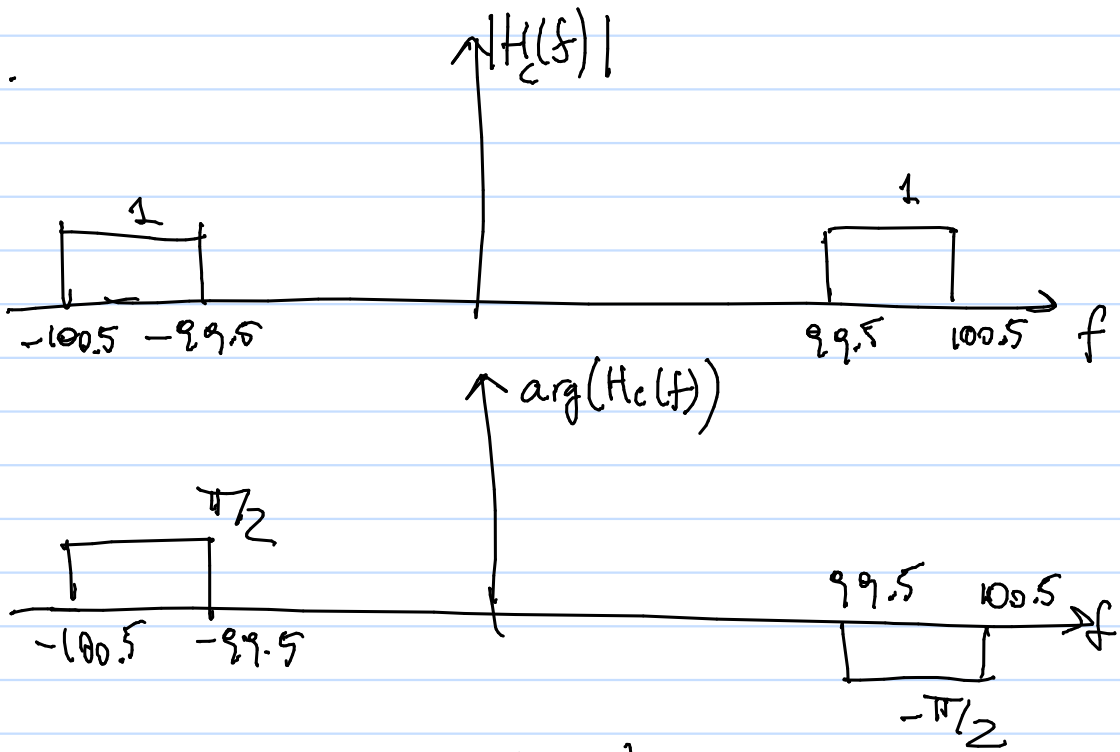
$$X_p(t) = \begin{cases} \pi/2 & \text{when } \text{sinc}(t) > 0 \\ -\pi/2 & \text{when } \text{sinc}(t) < 0 \end{cases}$$



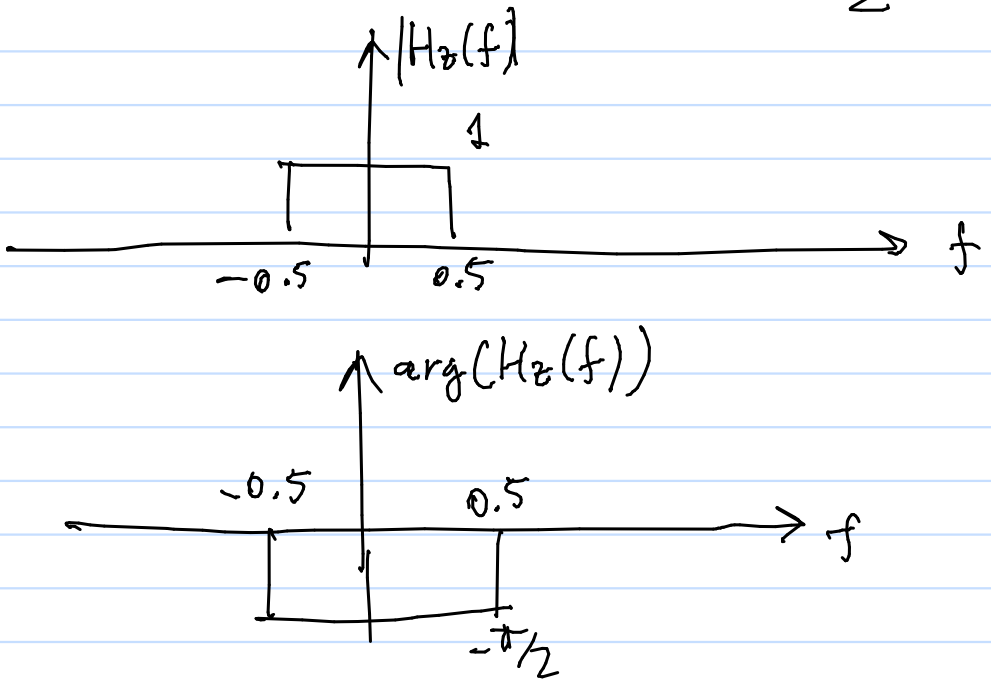
c.  $X_z(f) = j X_a(f)$



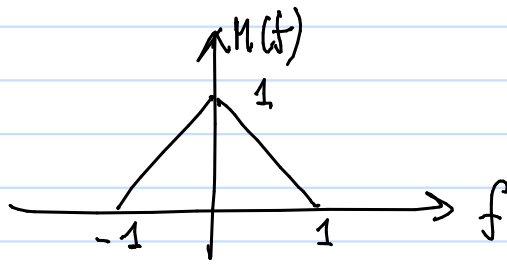
d.



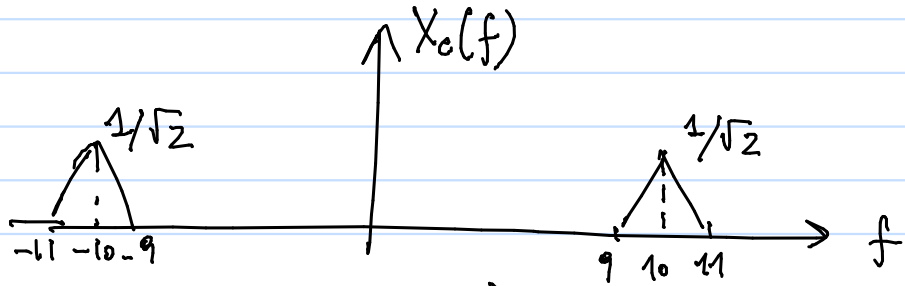
e.



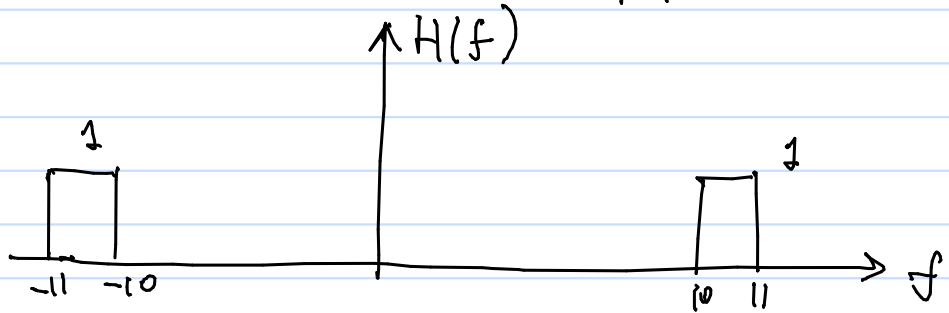
2



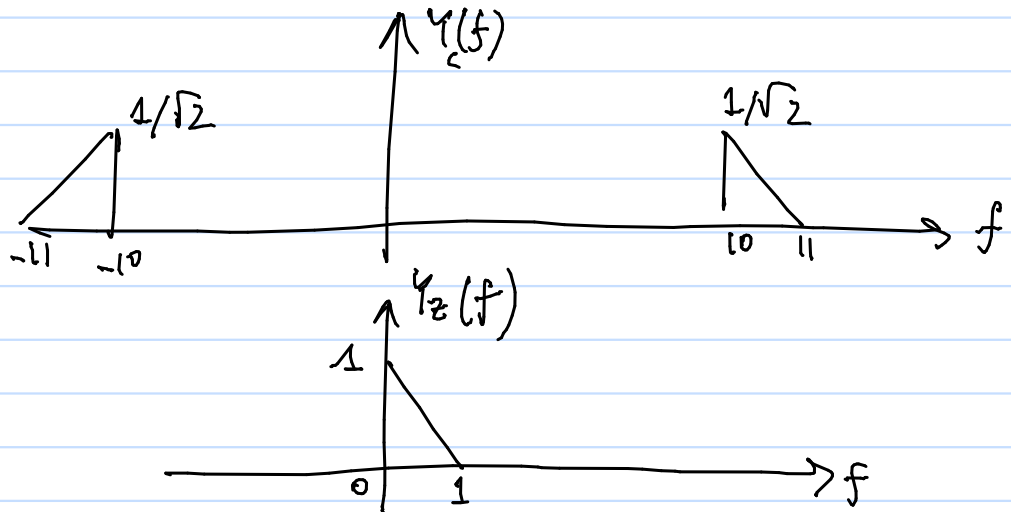
a.



b.



c.



$y_2(t)$  is complex.

$$3. \quad m(t) = \text{sinc}(2(t-2))$$

$$a. \quad x_c(t) = \sqrt{2} \cos(20\pi t + \text{sinc}(2(t-2)))$$

$$b. \quad B_T \approx 2W(1+D)$$

$$W = 1 \text{ Hz}$$

$$D = \frac{1}{2\pi W} \max_t |\text{sinc}(2(t-2))| = \frac{1}{2\pi}$$

$$\Rightarrow B_T \approx 2\left(1 + \frac{1}{2\pi}\right)$$