EXERCISE 11.3: Sketch graphs of the real and imaginary parts of $X(j\omega)$ from Exercise 11.2 as functions of ω and compare them to Figures 11-3(b) and 11-3(c).

McClellan, Schafer and Yoder, *Signal Processing First*, ISBN 0-13-065562-7.
Prentice Hall, Upper Saddle River, NJ 07458.

SOLUTION

$$X(j\omega) = \frac{1}{b-j\omega}\left(\frac{b+j\omega}{b+j\omega}\right) = \frac{b+j\omega}{b^2+\omega^2}$$

Real part: $X_r(j\omega) = \dfrac{b}{b^2+\omega^2}$

Imaginary part: $X_I(j\omega) = \dfrac{\omega}{b^2+\omega^2}$

When compared to $\dfrac{1}{a+j\omega}$, the only difference is the minus sign in the imaginary part.