Discrete time systems and z-transform

Exercises module 4

1. Calculate the inverse z-transform of the following sequences:
   a) $X(z) = (1 + 3z)(1 + 2z^{-1})(1 - z^{-1})$
   b) $X(z) = \frac{1-\frac{1}{2}z^{-1}}{1+\frac{3}{4}z^{-1}+\frac{1}{8}z^{-2}} \quad |z| > \frac{1}{2}$
   c) $X(z) = \frac{1-\frac{1}{2}z^{-1}}{1-\frac{1}{4}z^{-2}} \quad |z| > \frac{1}{2}$
   d) $X(z) = \frac{1-az^{-1}}{z^{-1}-a} \quad |z| > \left|\frac{1}{a}\right|$
   e) $X(z) = \ln(1 - 4z) \quad |z| < \frac{1}{4}$
   f) $X(z) = \frac{3-7z^{-1}+5z^{-2}}{1-\frac{5}{2}z^{-1}+z^{-2}} \quad \frac{1}{2} < |z| < 2$