Question. (a) *Write the definition of Cauchy sequence*

(b) *Show that $a_n = \frac{(-1)^n}{n}$ is a Cauchy sequence.*

(c) *Show that $a_n = \frac{(-1)^n (n+3)}{n+2}$ is not a Cauchy sequence.*

(d) *Write the condition $\lim_{n \to \infty}(a_n) = 0$.*

(e) *Let (a_n) be a Cauchy sequence. Write the condition that $([a_n]) \neq 0$. Your sentence should have a "greater than" sign ($>$) at the end.*

(f) *Show that if $[(a_n)] \neq 0$, then there exists some m such that either for all $n \geq m$ $a_n > 0$ or for all $n \geq m$ $a_n < 0$.*

(g) *How do you reconcile your examples in (b) and (c) with your statement in (f)*