Part a

GIF

$$\frac{\{P \wedge E_1\}S_1\{Q\}, \{P \wedge E_2\}S_2\{Q\}, \ldots, \{P \wedge E_n\}S_n\{Q\}}{\{P\}\ gif\ E_1 \to S_1\ \ E_2 \to S_2\ \ \ldots\ \ E_n \to S_n\ end\{Q\}}$$

Part b

$$\dfrac{\dfrac{\dfrac{\dfrac{}{\{z<0 \wedge x \leq 0\}y := -x\{z<0 \wedge y \geq 0\}}ASSIGN}{\{z<0 \wedge x > -5 \wedge x \leq 0\}y := -x\{z<0 \wedge y \geq 0\}}CONS, \dfrac{\dfrac{}{\{z<0 \wedge x \geq 0\}y := x\ \{z<0 \wedge y \geq 0\}}ASSIGN}{\{z<0 \wedge x > -5 \wedge x \geq 0\}y := x\ \{z<0 \wedge y \geq 0\}}CONS}{\{z<0 \wedge x > -5\}gif\ x \leq 0 \to y := -x[]x \geq 0 \to y := x\ end\{z<0 \wedge y \geq 0\}}GIF \quad \dfrac{\dfrac{}{\{z-y<0\}\ z := z-y\ \{z<0\}}ASSIGN}{\{z<0 \wedge y \geq 0\}\ z := z-y\ \{z<0\}}CONS}{\{z<0 \wedge x > -5\}\ gif\ x \leq 0 \to y := -x[]x \geq 0 \to y := x\ end\ z := z-y\ \{z<0\}}COMP$$

$$\dfrac{\dfrac{\{z<0 \wedge x > -5\ gif\ x \leq 0 \to y := -x[]x \geq 0 \to y := x\ end\ z := z-y\ \{z<0\}}{\{z<0\}while\ x > -5\ do\ gif\ x \leq 0 \to y := -x[]x \geq 0 \to y := x\ end\ z := z-y\ end\ \{z<0 \wedge \neg(x > -5)\}}WHILE}{\{z<0\}while\ x > -5\ do\ gif\ x \leq 0 \to y := -x[]x \geq 0 \to y := x\ end\ z := z-y\ end\ \{z<0\}}\text{CONSEQ}$$