```
\langle e_1, E, S \rangle \Downarrow \langle v_1, S' \rangle, \langle e_2, E, S' \rangle \Downarrow \langle v_2, S'' \rangle
                          (\text{seg } e_1 \ e_2) \Downarrow \langle v_2, S'' \rangle
Part b
```

Part a SEQ

$$\frac{\textbf{ALIAS}}{l = E(x_2), \langle e, E + \{x_1 \rightarrow l\}, S \rangle \Downarrow \langle v_1, S' \rangle}{(\text{alias } x_1 \ x_2 \ e) \Downarrow \langle v_1, S' \rangle}$$
 Part c

Part c 
$$\frac{\overline{\langle 3, \{x \to l, x \to$$

$$l = E(x), \frac{\frac{\langle 3, \{x \to l, y \to l\}, \{l \to 1\}\rangle, \Downarrow \langle 3, \{l \to 1\}\rangle}{\langle (:= x\ 3), \{x \to l, y \to l\}, \{l \to 1\}\rangle, \Downarrow \langle 3, \{l \to 3\}\rangle} ASSGN, \frac{\langle 5, \{x \to l, y \to l\}, \{l \to 3\}\rangle, \Downarrow \langle 5, l \to 3\rangle}{\langle (:= y\ 5), \{x \to l, y \to l\}, \{l \to 3\}\rangle, \Downarrow \langle 5, \{l \to 5\}\rangle} ASSGN}{\langle (:= y\ 5), \{x \to l, y \to l\}, \{l \to 3\}\rangle, \Downarrow \langle 5, \{l \to 5\}\rangle} ASSGN$$

$$\begin{array}{c}
lf(t), \psi(0), \psi(1) \\
 & \downarrow lf(t), \psi(0), \psi(0)
\end{array}$$

$$\begin{array}{c}
lf(t), \psi(0), \psi(0$$

$$(3) := y 5$$

$$l = E(x), \langle (+ (:= x 3) (:= y 5)), \{x \rightarrow l, y \rightarrow l\}, \{l \rightarrow 1\} \rangle \Downarrow \langle 8, \{l \rightarrow 5\} \rangle$$

$$/(c) | (x \rightarrow l) (:= y 3) (:= y 5) \rangle \langle x \rightarrow l \rangle \langle x \rightarrow l \rangle \parallel \langle x \rightarrow l \rangle \parallel$$

$$\frac{x \to l, y - l}{\{x \to l\}, }$$

$$\frac{t - E(x), (+ (.- x 3) (.- y 5)), (x \to t, y \to t), (t \to 1)}{\langle (\text{alias y x } (+ (:= x 3) (:= y 5))), (x \to t), (t \to 1) \rangle \Downarrow \langle 8, \{t \to 5\} \rangle}$$

 $\langle (\text{let x 1 (seq (alias v x (+ (:= x 3) (:= v 5))) x)}),0,0 \rangle \downarrow \langle 5, L1 \rightarrow 5 \rangle$ 

$$\rightarrow l$$
} { $l \rightarrow 1$ }

$$\rightarrow l$$
},  $\{l \rightarrow 1\}$ 

$$\rightarrow l$$
},  $\{l \rightarrow 1\}$ 

3) 
$$(:= y 5)), \{x \to l\}, \{l \to 1\} \downarrow \langle 8, \{l \to 5\} \rangle$$
  
  $\langle (\text{seq (alias } y \times (+ (:= x 3) (:= y 5))) \times)), \{x \to l\}, \{l \to 1\} \rangle \Downarrow \langle 5, L1 \to 5 \rangle$ 

$$\}\rangle \downarrow \langle 5, L1 \rightarrow 5\rangle$$

-ADD

$$\{x \to l\}, \{l \to 5\}\rangle \downarrow$$

$$,\{l \rightarrow 5\}\rangle$$

$$\rightarrow 5$$
} $VAR$ 

$$AR$$
 $---SEQ$ 
 $-----$ 
LET