1 const (K)

$$\_, (\rho', x, e^{\cdot}) : S, H, K.$$

$$\rightsquigarrow \rho', S, H[x \overset{\cup}{\longmapsto} K], e$$

3. $\{ e = \text{cons } x \; y$

$$\rho, (\rho', z, e) : S, H, \text{cons } x \; y$$

$$\rightsquigarrow \rho', S, H[z \overset{\cup}{\longmapsto} (\rho(x), \rho(y))], e$$

4.0 $x - (v_1, v_2)$

$$\rho, (\rho', z, e) : S, H, (\text{car } x) \rightsquigarrow$$

$$\rho', S, H[z \to v_1], e$$

4.1

$$(\text{car } x) \qquad \rho(x) = (e, \rho')$$

$$\rho, S, H, (\text{car } x) \rightsquigarrow \rho' \dashv\dashv \rho, \underline{(\rho, x, \text{car } x) : S}, H, e$$

5.0 e is $(+\ x\ y)$

(i)
$$\frac{H(\rho(x)) \in \mathbb{N}, \quad H(\rho(y)) \in \mathbb{N}}{\rho,\ (\rho', z, e\ ):S,\ H,\ +\ x\ y \rightsquigarrow \rho',\ S,\ H[\rho(z) \rightarrow \underline{H(\rho(x)) + H(\rho(y))}],\ e}$$

(ii)
$$\frac{\rho(x) = (e, \rho')}{\rho, S, H, +\ x\ y \rightsquigarrow \rho' \# \rho,\ (\rho, x, +\ x\ y):S,\ H,\ e}$$

(iii)
$$\frac{H(\rho(x)) \in \mathbb{N} \quad H(\rho(y)) = (e, \rho')}{\rho, S, H, \underline{+\ x\ y} \rightsquigarrow \rho' \# \rho,\ (\rho, y, +\ x\ y):S,\ H,\ e}$$

6. Call to function $(\text{define } (f\ \vec{y})\ e_f)$

$$\rho, S, H, f\ \vec{x} \rightarrow [\rho(\vec{x})/\vec{y}],\ S, H, e_f$$

After evaluating the function body, the ρ, x and cont. are picked up from the stack.

$\vdash^{C}$ - create $\qquad \stackrel{U}{\longmapsto}$ update

l - new loc

7. $\rho, S, H, \text{let } x \leftarrow s \text{ in } e \rightsquigarrow$
$x \mapsto l : \rho, S, H[l \mapsto (s, x \mapsto l : \lfloor \rho \rfloor_{FV(s)})], e$

$x - (e, \rho')$

8.0 $\rho, S, H, \text{return } x \rightsquigarrow$
$\rho' {+\!+} \rho, S, H, e$

$x - w$ (WHNF)

8.1. $\rho, (\rho', z, e) : S, H, \text{return } x \rightsquigarrow$
$\rho', S, H[\rho(z) \stackrel{U}{\longmapsto} w], e$

$[\,], ([\,], \text{result}, \text{print result}), \{\}, e_{main}$