1 Inference Rules

$\Gamma \vdash a \Rightarrow t$ means that under the assumptions Γ we can infer that term a has type t. These rules have Γ and a available as inputs and product t as an ouput.

$$\frac{}{\vdash 123 \Rightarrow \text{integer}}\ \text{infer integer literal}$$

$$\frac{}{x : t \vdash x \Rightarrow t}\ \text{infer known symbol}$$

$$\frac{\vdash x \Leftarrow t}{\vdash x : t \Rightarrow t}\ \text{infer type annotation}$$

$$\frac{x : t \vdash b \Rightarrow s}{\vdash \#(x : t = b) \Rightarrow t \rightarrow s}\ \text{infer function body}$$

$$\frac{\vdash f \Rightarrow a \rightarrow b \quad \vdash x \Rightarrow c \quad \vdash c \leq a}{\vdash f\ x \Rightarrow b}\ \text{infer application}$$

2 Checking Rules

$\Gamma \vdash a \Leftarrow t$ means that under the assumptions Γ, we can prove that term a has type t. These rules take Γ, a, and t as inputs and produce a boolean output. Either a has assumed type t or it doesn't.

$$\frac{\vdash x \Rightarrow s \quad s \leq t}{\vdash x \Leftarrow t}\ \text{check}$$

3 Subtype Rules

$a \leq b$ means that a type a satisfies the constraints of a type b.

$$\frac{}{\mathit{integer} \leq \mathit{integer}}\ \text{consistent integers}$$