Simple function:

$$\begin{aligned} f\colon \mathbf{R} &\to \mathbf{R} \\ x &\mapsto f(x) \end{aligned}$$

Simple function with declaration:

$$\begin{aligned} f\colon \mathbf{R} &\to \mathbf{R} \\ x &\mapsto x^2 \end{aligned}$$

Function with alternative writing:

$$\begin{aligned} \exp\colon \mathbf{R} &\to \mathbf{R} \\ x &\mapsto e^x \end{aligned}$$

Function with alternative writing and declaration:

$$\begin{aligned} \exp\colon \mathbf{R} &\to \mathbf{R} \\ x &\mapsto e^x := \lim_{n\to\infty} \left(1 + \tfrac{x}{n}\right)^n \end{aligned}$$

Function with different domain and codomain:

$$\begin{aligned} \operatorname{sqrt}\colon \mathbf{N} &\to \mathbf{R} \\ n &\mapsto \operatorname{sqrt}(n) \end{aligned}$$

Function with different domain and codomain, and alternative writing:

$$\begin{aligned} \operatorname{sqrt}\colon \mathbf{N} &\to \mathbf{R} \\ n &\mapsto \operatorname{sqrt}(n) := \sqrt{n} \end{aligned}$$

Function with different domain and codomain, alternative writing and declaration:

$$\begin{aligned} \operatorname{sqrt}\colon \mathbf{N} &\to \mathbf{R} \\ n &\mapsto \sqrt{n} := \exp\left(\tfrac{1}{2} \ln n\right) \end{aligned}$$