## Part II

## Foundations

## Vocabularies

$n$ ! " $n$ factorial"
$\binom{n}{k}$ " $n$ choose $k$ "
$x_{i}$ " $x$ subscript $i$ "
" $x$ sub $i$ "
" $x$ i"
$\log _{b} a$ "log to the base $b$ of $a$ "
$" \log a$ to the base $b "$

$$
f: X \rightarrow Y, x \mapsto x^{2}
$$

$f$ is a function that maps from domain (Definitionsbereich) $X$ to codomain (Zielmenge) $Y$. The set $\{y \in Y \mid \exists x \in X: f(x)=y\}$
is the image or the range of the function
(Bildbereich/Wertebereich).

```
Vocabularies
    a\cdotb "a times b"
        "a multiplied by b"
        "a into b"
    a
        "a by b"
        "a over b"
        (a: numerator (Zähler), b: denominator (Nenner))
    ab "a raised to the b-th power"
        " }a\mathrm{ to the b-th"
        " a raised to the power of b"
        " a to the power of b"
        "a}\mathrm{ raised to b"
        "a}\mathrm{ to the b"
        "a}\mathrm{ raised by the exponent of b"

\section*{3 Goals}
- Gain knowledge about efficient algorithms for important problems, i.e., learn how to solve certain types of problems efficiently.
- Learn how to analyze and judge the efficiency of algorithms.
- Learn how to design efficient algorithms.```

