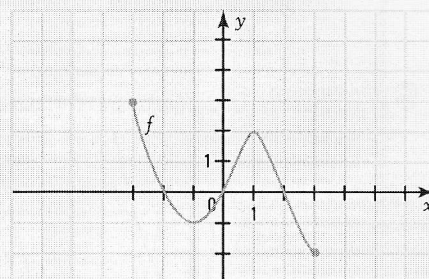


4. The study of a function consists of determining:

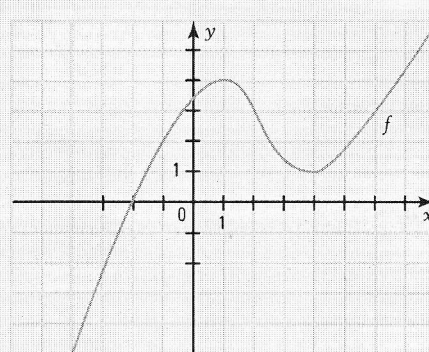
- 1° the domain and range of the function.
- 2° the zeros and y-intercept if they exist.
- 3° the sign of the function.
- 4° the increasing and decreasing intervals.
- 5° the extrema of the function, if they exist.

Do a study of the following functions.

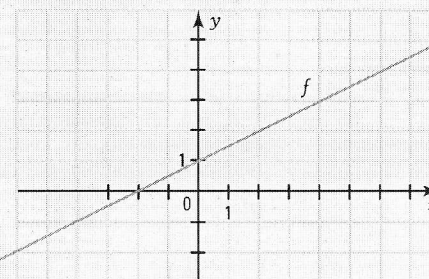
- a)
- 1. **Dom $f = [-3, 3]$; ran $f = [-2, 3]$.**
 - 2. **Zeros: -2, 0 and 2; y-intercept: 0**
 - 3. **f is negative over $[-2, 0] \cup [2, 3]$.**
 f is positive over $[-3, -2] \cup [0, 2]$.
 - 4. **f is decreasing over $[-3, -1] \cup [1, 3]$.**
 f is increasing over $[-1, 1]$.
 - 5. **$\max f = 3$; $\min f = -2$.**



- b)
- 1. **Dom $f = \mathbb{R}$; ran $f = \mathbb{R}$.**
 - 2. **Zero: -2; y-intercept: 3.5**
 - 3. **f is negative over $]-\infty, -2[$.**
 f is positive over $[-2, +\infty[$.
 - 4. **f is increasing over $] \infty, 1] \cup [4, +\infty [$.**
 f is decreasing over $[1, 4]$.
 - 5. **There are no extremum.**



- c)
- 1. **Dom $f = \mathbb{R}$; ran $f = \mathbb{R}$.**
 - 2. **Zeros: -2; y-intercept: 1**
 - 3. **f is negative over $]-\infty, -2[$.**
 f is positive over $[-2, +\infty[$.
 - 4. **f is increasing over \mathbb{R} .**
 f is never decreasing
 - 5. **There are no extremum.**



- d)
- 1. **Dom $f = \mathbb{R}$; ran $f =]-\infty, 4]$.**
 - 2. **Zeros: -2 and 2; y-intercept: 4**
 - 3. **f is negative over $]-\infty, -2] \cup [2, +\infty[$.**
 f is positive over $[-2, 2]$.
 - 4. **f is increasing over $]-\infty, 0]$.**
 f is decreasing over $[0, +\infty[$.
 - 5. **$\max f = 4$; no minimum.**

