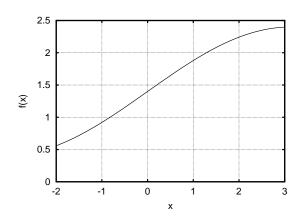
## Definite Integrals and Their Interpretations



- 1. Estimate the following definite integrals using the f(x) in the figure above:
  - (a)  $\int_0^2 f(x) dx$ .
  - (b)  $\int_{-1}^{0} f(x) dx$ .
  - (c)  $\int_{-1}^{2} f(x) dx$ .
- 2. What do the above results let you conclude about

$$\int_{a}^{b} f(x) dx + \int_{b}^{c} f(x) dx = ???$$
 (1)

- 3. Estimate  $\int_2^4 x^2 dx$ .
- 4. Let r(t) be the rate, in people per minute, at which people arrive at the dining hall for dinner. Consider the following integral:

$$\int_{0}^{30} r(t) dt . {2}$$

- (a) What are the units of the above integral?
- (b) What is the practical interpretation of the above integral?
- 5. Electric charge is distributed non-uniformly along 2 meter length of wire. Let the density of the charge be given by  $\sigma(x)$ , in Coulombs per meter, where x is the position on the wire, in meters, as measured from the left end of the wire. Consider the following integral:

$$\int_0^2 \sigma(x) \, dx \,. \tag{3}$$

- (a) What are the units of the above integral?
- (b) What is the practical interpretation of the above integral?