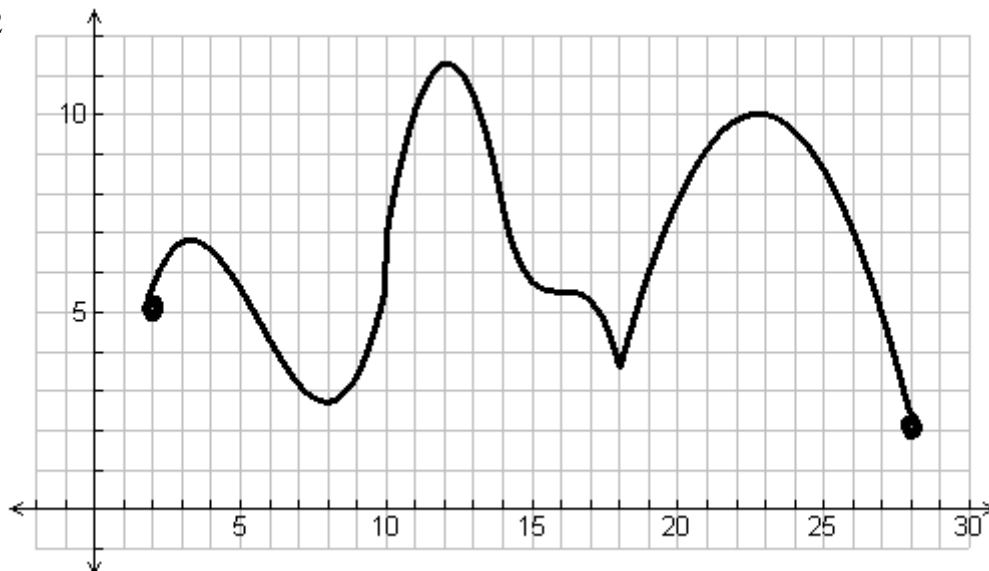


Section 4.2

*Definitions*

- A function has an **absolute (or global) maximum** at $x = c$ if $f(c) \geq f(x)$ for all x in the domain of f . $f(c)$ is called the maximum value of f on its domain.
- A function has an **absolute (or global) minimum** at $x = c$ if $f(c) \leq f(x)$ for all x in the domain of f . $f(c)$ is called the minimum value of f on its domain.

The absolute maximum and minimum values are called the absolute extreme values of the function. Essentially, they are the highest and lowest y -values of the function respectively.

Refer to the function f graphed above. At what value of x does f have its absolute maximum value? What is the maximum value of the function?

At what value of x does f have its absolute minimum value? What is the minimum value of the function?

Definitions

- A function has a **local (or relative) maximum** at $x = c$ if $f(c) \geq f(x)$ for all x in an open interval containing $x = c$.
- A function has a **local (or relative) minimum** at $x = c$ if $f(c) \leq f(x)$ for all x in an open interval containing $x = c$.

Essentially, a function has a local maximum or minimum at $x = c$ if f has a *turning point* at $(c, f(c))$.

Refer again to the function in the graph above. At what value(s) of x does f have a local maximum?

At what value(s) of x does f have a local minimum?