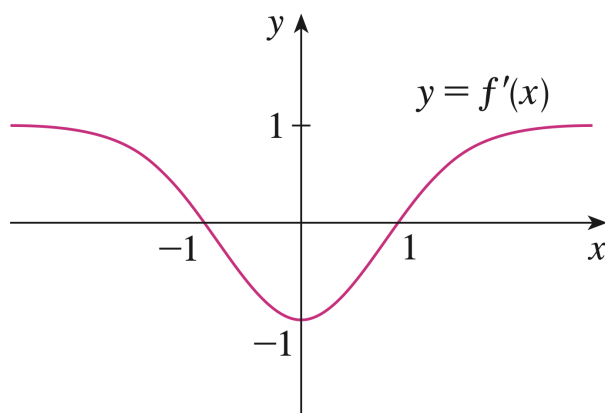


4.3 What Does f' Say About f ?

Theorem.

- If _____ on an interval, then f is _____ on that interval.
- If _____ on an interval, then f is _____ on that interval.

Example. The graph of the derivative f' of a function f is shown below. If $f(0) = 0$, sketch a possible graph of f .

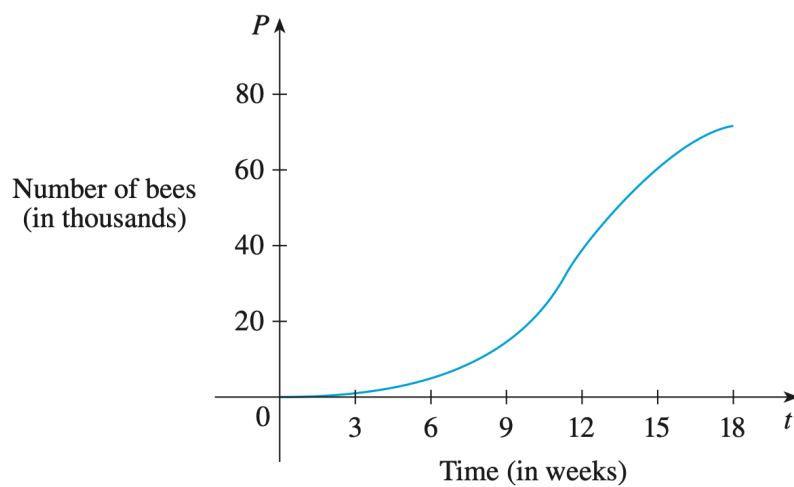


Theorem.

- If _____ on an interval, then f is _____ on that interval.
- If _____ on an interval, then f is _____ on that interval.

Example. Below is a population graph for honeybees raised in an apiary.

- Over what intervals is P concave upward or concave downward?
- When is the rate of population increasing the fastest?



Example. Sketch a possible graph of a function f that satisfies the following conditions:

- $f'(x) > 0$ on $(-\infty, 1)$, $f'(x) < 0$ on $(1, \infty)$.
- $f''(x) > 0$ on $(-\infty, -2)$ and $(2, \infty)$, $f''(x) < 0$ on $(-2, 2)$.
- $\lim_{x \rightarrow -\infty} f(x) = -2$, $\lim_{x \rightarrow \infty} f(x) = 0$.