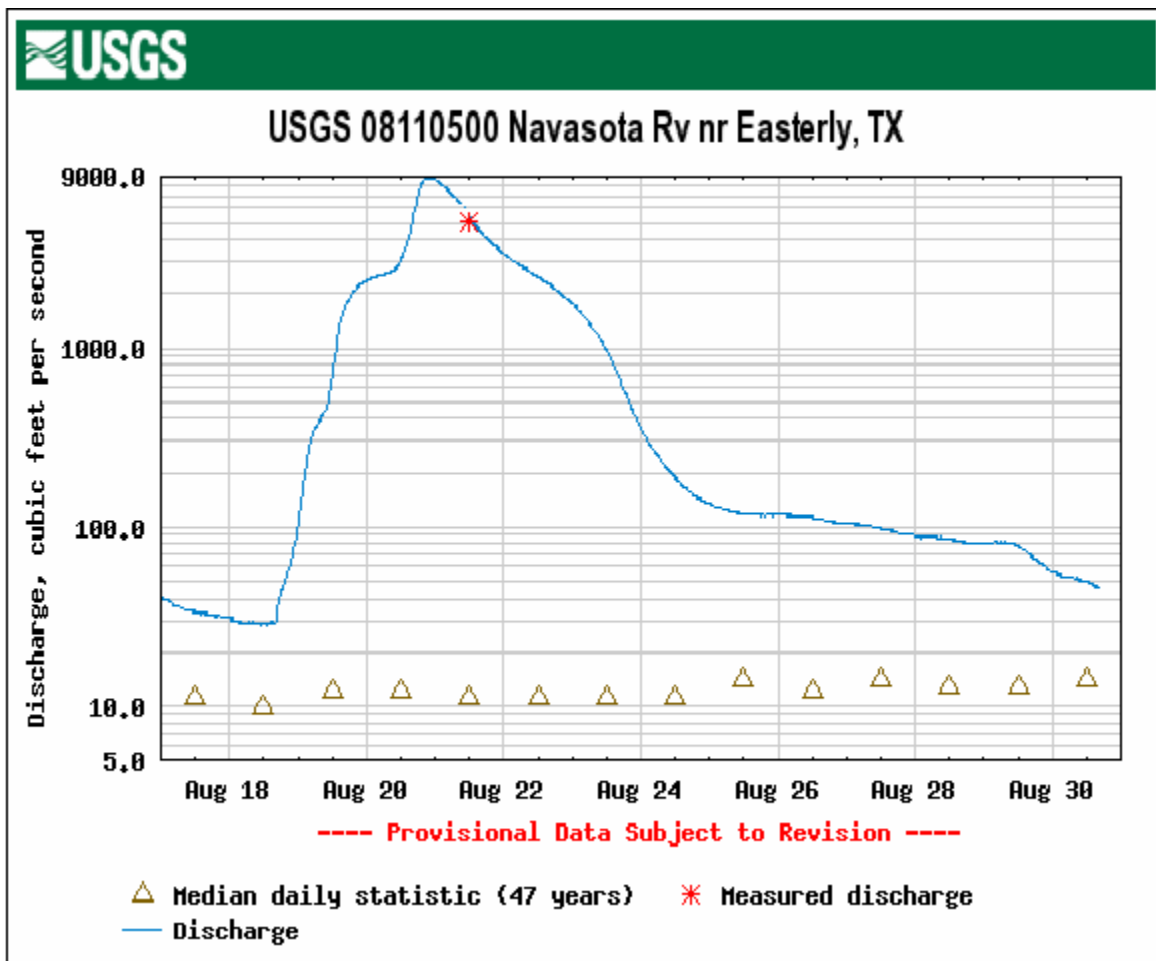


Math 150 Lecture Notes Average Rate of Change

f is **increasing** on an interval I if $f(x_1) < f(x_2)$ whenever $x_1 < x_2$ in I .

f is **decreasing** on an interval I if $f(x_1) > f(x_2)$ whenever $x_1 < x_2$ in I .

Example 1: Determine the intervals on which the function is increasing and decreasing.



Source: <http://waterdata.usgs.gov>

The **average rate of change** of the function $y = f(x)$ between $x = a$ and $x = b$ is

$$\text{Average rate of change} = \frac{\text{change in } y}{\text{change in } x} = \frac{f(b) - f(a)}{b - a}$$

The average rate of change is the slope of the **secant line** between $x = a$ and $x = b$ on the graph of f , that is, the line that passes through $(a, f(a))$ and $(b, f(b))$.

Example 2: Determine the average rate of change of the given function between the given values of the variable.

$$f(x) = \frac{2}{\sqrt{x}} \quad x = 1, \quad x = 16$$

Example 3: Determine the average rate of change of the given function between the given values of the variable.

$$f(x) = \frac{2}{\sqrt{x}} \quad x = a, \quad x = a + h$$