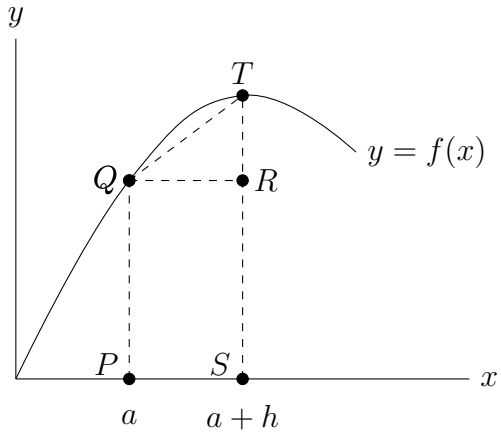
Math 122B-008 Worksheet 1



1. Use the graph above to answer the following questions. Note that the capital letters are labeling *points*, i.e. (x, y) pairs, while the lower case letters are labeling *coordinate values*. A *line segment* is given by its endpoints, i.e. QR is the notation for 'the line connecting point Q to point R'. You do not need to re-draw the graph in your solutions!

(a) The value of h is represented by the length of which line segment?

(b) The value of $f(a+h)$ is represented by the length of which line segment?

(c) The value of $f(a)$ is represented by the length of which line segment?

(d) What does the length of the line segment RT represent?

(e) The value of $\frac{f(a+h)-f(a)}{h}$ represents what on the graph? (hint: think rise-over-run).

2. Compute the following limits:

(a) $\lim_{a\to 0^+} \dfrac{1}{\ln(a)}$

(b) $\lim_{x\to\infty} f(x)$ where $f(x) = \frac{3x^2-3}{x^2-4}$

3. Suppose that $f(x)$ is continuous and $f(a) = 1$. What is $\lim_{x\to a} f(x)$?

4. Simplify the following expression:

$$\frac{g(x+h) - g(x)}{h} \quad \text{where} \quad g(x) = x^2$$