

Homework Set 17

The (Limit) Definition of the Derivative (sections 2.1 & 2.2)

1. State the formal definition of the derivative of a function. (Hint: this includes a formula.)

Compute the derivative for each of the following functions using the definition of the derivative.

2. $f(x) = 3x^2 - x + 7$

3. $g(t) = \frac{2t-1}{t+5}$

4. $f(x) = 4$

5. $h(x) = \sqrt{2x + 1}$

6. $g(t) = \frac{1}{\sqrt{t}}$

Each of the following limits represents the derivative of some function f at some number a . Find the function f and the number a .

7.
$$\lim_{h \rightarrow 0} \frac{\sqrt[3]{27+h} - 3}{h}$$

8.
$$\lim_{x \rightarrow 1} \frac{x^4 + x - 2}{x - 1}$$

9.
$$\lim_{h \rightarrow 0} \frac{(2+h)^3 - 8}{h}$$

10.
$$\lim_{x \rightarrow \pi/4} \frac{\tan x - 1}{x - \pi/4}$$