Exercise 1.
(a) Find the domain of the function $f(x) = \sqrt{2-x} + \ln(x-1)$.
(b) Sketch the graph of the function $f(x) = \ln(-x)$ and state the domain of the function.
(c) Sketch the graph of the function $f(x) = e^{3+x} - 1$ and find the x-intercept and the y-intercept.

Exercise 2. Use the very definition of the derivative (i.e. $f'(a) = \lim \ldots$) to compute the derivative of $f(x) = \dfrac{1}{x+1}$ at $x = 2$.

Exercise 3. Find the vertical and horizontal asymptotes of $f(x) = \dfrac{2x^3 - 2x}{(x-1)(x^2 - 5x + 6)}$.

Exercise 4. For what value of a is the function $f(t) = \begin{cases} \frac{\sqrt{t^2+3}-3}{t^2-6} & \text{if } t \neq \sqrt{6}, \\ a & \text{if } x = \sqrt{6} \end{cases}$ continuous?

Exercise 5. (a) Find the equation of the tangent line to $f(x) = x^{1/4}$ at $x = 10000$. Hint: $10000^{1/4} = 10$.
(b) Use part (a) to obtain an approximate value of $10100^{1/4}$.