34A - REVIEW SHEET

Exercise 1.

Find the rate of change for the function $f(x) = \frac{1}{x^2}$ within $x = A$ and $x = B$.
Use the rate of change of $f(x)$ to determine its derivative.

Exercise 2. Solve for x

a) $\log(9 + x) = 3a$

b) $2^{\frac{1}{x}} = 6 + b$

c) $\log(x^2 - 1) = 2$.

Exercise 3.

Solve for x and y:

$$\begin{cases} 2x - y = c \\ x + y = 2c \end{cases}$$

Exercise 4.

Let $f(x) = \sqrt{x} - \frac{1}{\sqrt{x}}$.

a) Find the equation of the tangent line at $x = 4$.

b) Find the coordinates of the point where the tangent line meets the line $y = x + 1$.

Exercise 5.

Calculate the derivative of

a) $\dfrac{3}{x^3} - \dfrac{\sqrt{x}}{2}$

b) $x(\sqrt{x} - 3)$

c) $\dfrac{(x-1)^2}{x}$

Exercise 6. Determine for which value of x the following functions are increasing or decreasing and concave up or concave down:

$a) f(x) = x(x-3)(x+3)$

$b) f(x) = x - \frac{1}{x}$

Exercise 7. A small poster has to have area $100in^2$. There is a margin around the edges of 3 in at the top and 2 in at the sides and bottom where nothing is printed.

a) Express the area of the printed part in terms of the length of the entire poster.

b) What dimensions should the poster be in order to have the largest printed area?

Exercise 8.

On friday morning the stock A decreased its value by 4% each hour continuously. If its value at 8am was 30$, after how many minutes did its value reach 28$?

Exercise 9.

A train is travelling from New York to Boston with an average speed of 80 mph. If it takes 5 hours to reach its destination, what is the distance within the two cities?