

Problem 1

Find the average rate of change of $f(x) = x^2 + 2$ over the interval $[1, 2]$.

Problem 2

Given the position function $p(t) = t^3 + t$, find the average velocity from $t = 0$ to $t = 1$.

Problem 3

Find the average rate of change for $f(x) = x^2 + x$ over the interval $[1, 1 + h]$. Then simplify your answer so that h is not in the denominator. (Warning: $f(1 + h) \neq 1^2 + 1 + h$)

Problem 4

Use your answer from the previous problem to give the "instantaneous rate of change" of $f(x) = x^2 + x$ at $x = 1$. (i.e. take your answer from problem 3 and plug in $h = 0$.)

Problem 5

Repeat the process from problems 3 and 4 to find the "instantaneous rate of change" of $f(x) = \frac{1}{x}$ at $x = 2$.