2 Average Values

Problem 2.1. *Set up (but do not solve) an integral to compute the average value of the following functions on the given intervals.*

a) $f(x) = x^2 + 2x - 1$ on $[-1, 3]$

b) $f(t) = \sin(t)\cos(t^2)$ on $[0, 1]$

c) $g(x) = e^{x^2}\ln(2x - 1)$ on $[2, 3]$

d) $f(y) = 2^y$ on $[0, \frac{3}{2}]$

e) $h(w) = w^3\cos(2w) + 3\sin^2(e^w)$ on $[-\pi, \pi]$

f) $g(z) = \tan^{-1}(\sin(2z))$ on $[-\frac{5\pi}{2}, \frac{\pi}{2}]$

g) $q(r) = r^3 - 3r^{\sin(r)}$ on $[-1, 0]$

h) $p(t) = \ln(\sec(t^3 - 3t))$ on $[0, \pi]$

Problem 2.2. *Compute the average value of the following functions on the given intervals.*

a) $f(x) = 3x^2 + 2x - 1$ on $[0, 2]$

b) $g(x) = x^4 - 2x^2 + 3$ on $[-1, 1]$

c) $f(t) = \sin(t)$ on $[0, \frac{\pi}{2}]$

d) $g(y) = \frac{3}{y}$ on $[1, e]$

e) $h(z) = \cos(3z)$ on $[-\pi, 2\pi]$

f) $q(p) = 3p + 1 - \sin(2p)$ on $[0, \pi]$

(!) ***g)*** $j(x) = xe^x + e^x$ on $[0, \frac{1}{2}]$

(!) ***h)*** $t(y) = 2ye^{y^2}$ on $[-2, 1]$