

NAME :

1. Let  $x = [-4 \ -1 \ 2 \ 3 \ 9]$  and  $y = [80 \ 14 \ 2 \ 10 \ 184]$ .

Give the MATLAB command(s) to find the polynomial relation between  $x$  and  $y$ .

What is the degree of the polynomial  $p$  so  $y = p(x)$ ? Write the coefficients of  $p$ .

2. A Gaussian quadrature rule to approximate an integral is

$$\int_{-h}^{+h} f(x)dx \approx hf\left(-\frac{\sqrt{3}}{3}\right) + hf\left(+\frac{\sqrt{3}}{3}\right), \quad h > 0.$$

The formula at the right of  $\approx$  evaluates any function  $f$  at  $-\sqrt{3}/3$  and at  $+\sqrt{3}/3$  and multiplies the sum of the function values with  $h$ .

- (a) Give code for a MATLAB function `integrate` to compute the rule.

The input parameters for `integrate` are any function  $f$  and a number  $h$ .

- (b) Write the call to the function `integrate` to approximate  $\int_{-0.13}^{+0.13} \cos(x)dx$ .

Also write the approximation returned by `integrate`.

**Alternative:** Bring to class on Monday the answers to assignments 1, 3, and 4 of the third lecture on MATLAB; and assignments 3 and 8 of MATLAB lecture 4.