In-class exercise for interpolation

Problem 1. Computer controlled machines are used to shape a car fender. Use interpolation to define the entire fender.

Fender Data

X (ft)	0	.25	.75	1.25	1.5	1.75	1.875	2	2.125	2.25
Y	1.2	1.18	1.1	1	0.92	0.8	0.7	0.55	0.35	0

Problem 2. The following data defines the sea-level concentration of dissolved oxygen for fresh water as a function of temperature:

T, °C	0	8	16	24	32	40
o, mg/L	14.621	11.843	9.870	8.418	7.305	6.413

Estimate $o(27)$ using **(a)** linear interpolation, **(b)** Newton's interpolating polynomial, and **(c)** cubic splines. Note that the exact result is 7.986 mg/L.

Problem 3. Generate eight equally-spaced points from the function

$$f(t) = \sin^2 t$$

from $t = 0$ to 2π. Fit this data with **(a)** a seventh-order interpolating polynomial and **(b)** a cubic spline.