

Pregunta 1

Correcte

Puntuació
10,00 sobre
10,00

The logarithm in basis 2 function $y = \log_2(x)$ has a well-known table of values $(x_0, y_0), \dots, (x_{10}, y_{10})$

x	1	2	4	8	16	32	64	128	256	512	1024
y	0	1	2	3	4	5	6	7	8	9	10

(a) (3 points) Estimate $\log_2(7.13)$ using the above table of values for the logarithm and Matlab's interpolation by cubic splines.

- ☒ 2.8289 ✓
- ☐ 2.8057
- ☐ 2.7825
- ☐ 2.8089
- ☐ Leave it empty (no penalty)

Puntuació 3,00 sobre 3,00

La resposta correcta és: 2.8289

Hint: Using this estimation method, $\log_2(4.92) = 2.2866$.

(b) (3 points) For each intermediate point $x_1 = 2, \dots, x_9 = 512$, estimate the derivative $y'_i = \log'_2(x_i)$ as the slope of the segment from (x_{i-1}, y_{i-1}) to (x_{i+1}, y_{i+1}) . The value of the slope estimated this way at $x = 4$ is:

- ☐ 0.375
- ☐ Leave it empty (no penalty)
- ☐ 0.25
- ☐ 0.5
- ☒ 0.33333 ✓

Puntuació 3,00 sobre 3,00

La resposta correcta és: 0.33333

Hint: Just for checking, the slope of the segment from (x_3, y_3) to (x_7, y_7) is 0.033333. Take into account that $x_0 = 1$

(c) (4 points) Now consider the approximation of $\log_2(x)$ on the interval $[x_2, x_3]$ by a polynomial of degree 3, $p_3(x) = a_0 + a_1x + a_2x^2 + a_3x^3$, where their coefficients are computed from the following conditions

$$p_3(x_2) = y_2, \quad p_3(x_3) = y_3,$$

$$p'_3(x_2) = y'_2, \quad p'_3(x_3) = y'_3.$$

Use the values of y'_2, y'_3 estimated as in the previous section.

The value of $\log_2(7.13) \approx p_3(7.13)$ according to this estimation is:

- ☐ 2.8286
- ☐ 2.8446
- ☐ 2.8339
- ☐ Leave it empty (no penalty)
- ☒ 2.8392 ✓

Puntuació 4,00 sobre 4,00

La resposta correcta és: 2.8392

Hint: Using this estimation method, $\log_2(4.92) = 2.289$.

Torna a començar

Desa

Emplena amb les respostes correctes

Envia i acaba

Tanca la previsualització

[Informació tècnica](#) ▶

[Download this question in Moodle XML format](#)

[Expandeix-ho tot](#)

[Opcions de l'intent](#)

[Opcions de visualització](#)