Started on	Friday, 16 November 2018, 9:52 AM
State	Finished
Completed on	Friday, 16 November 2018, 12:38 PM
Time taken	2 hours 45 mins
Grade	**11.00** out of 12.00 (**92**%)

Question 1

Incorrect

Mark 0.00 out of 1.00

Flag question

Which of the following best describes interpolation?

Select one:

- a. Creating a polynomial to estimate a function.
- b. Using known data values to estimate unknown values outside the range of the data. ✗
- c. Creating splines to estimate a curve.
- d. Using known data values to estimate unknown values inside the range of the data.

The correct answer is: Using known data values to estimate unknown values inside the range of the data.

Question 2

Correct

Mark 1.00 out of 1.00

Flag question

Which of the following is Lagrange's form for the interpolating quadratic?

Select one:

a.

$$f_2(x) = b_0 + b_1(x - x_0) + b_2(x - x_0)(x - x_1) + b_3(x - x_0)(x - x_1)(x - x_2)$$

b.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

c. ✓

$$f_2(x) = L_1 f(x_1) + L_2 f(x_2) + L_3 f(x_3)$$

d.

$$f_2(x) = b_0 + b_1(x - x_0) + b_2(x - x_0)(x - x_1)$$

The correct answer is:

$$f_2(x) = L_1 f(x_1) + L_2 f(x_2) + L_3 f(x_3)$$

Question 3

Correct

Mark 1.00 out of 1.00

Flag question

The interpolating polynomial for *n* data points is [unique] ✓, so it is [impossible] ✓ for a set of 10 data points to have an interpolating polynomial of degree 9, and another of degree 8.

special | rare | possible | necessary

Your answer is correct.

The correct answer is:
The interpolating polynomial for *n* data points is [unique], so it is [impossible] for a set of 10 data points to have an interpolating polynomial of degree 9, and another of degree 8.

Question 4

Correct

Mark 1.00 out of 1.00

Flag question

What is the equation for the first Lagrange polynomial for quadratic interpolation?

Select one:

a.

$$b_1 = \frac{y_1 - y_0}{x_1 - x_0}$$

b.

$$y = b_0 + b_1(x - x_0) + b_2(x - x_0)(x - x_1) + b_3(x - x_0)(x - x_1)(x - x_2)$$

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c.

$$L_1 = \frac{(x - x_1)(x - x_2)}{(x_0 - x_1)(x_0 - x_2)}$$

✓

d.

$$L_1 = \frac{x - x_1}{x_0 - x_1}$$

The correct answer is:

$$L_1 = \frac{(x - x_1)(x - x_2)}{(x_0 - x_1)(x_0 - x_2)}$$

Question 5

Correct

Mark 1.00 out of 1.00

Flag question

Which of the following is Newton's form for the interpolating quadratic?

Select one:

a.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

b.

$$f_2(x) = b_0 + b_1(x - x_0) + b_2(x - x_0)(x - x_1) + b_3(x - x_0)(x - x_1)(x - x_2)$$

c.

$$f_2(x) = L_1 f(x_1) + L_2 f(x_2) + L_3 f(x_3)$$

d.

$$f_2(x) = b_0 + b_1(x - x_0) + b_2(x - x_0)(x - x_1)$$

✓

The correct answer is:

$$f_2(x) = b_0 + b_1(x - x_0) + b_2(x - x_0)(x - x_1)$$

Question 6

Correct

Mark 1.00 out of 1.00

Flag question

If we have *n* data points, what is the maximum degree of the interpolating polynomial?

Select one:

a.

$$n - 2$$

b.

$$n$$

c.

$$n - 1$$

✓

d.

$$n + 1$$

The correct answer is:

$$n - 1$$

Question 7

Correct

Mark 1.00 out of 1.00

Flag question

Which of the following is a true statement about polynomial interpolation?

Select one:

a. When using the interpolating polynmial to estimate a function we always get better results by taking more points

b. If we choose a small enough interval, linear interpolation gives good approximations for all continuous functions.

c. Given n data points there are an infinite number of polynomials that pass through every point ✓

d. It doesn't matter how the x values are spaced

The correct answer is: Given n data points there are an infinite number of polynomials that pass through every point

Question 8

Correct

Mark 1.00 out of 1.00

Flag question

Why is the Vandermonde matrix generally not used to find the interpolating polynomial?

Select one:

a. The coefficients of higher powers of x are sensitive to round-off error ✓

b. It is too slow

c. It is sensitive to Runge's phenomenon.

d. It doesn't give the correct result.

The correct answers are: The coefficients of higher powers of x are sensitive to round-off error, It is too slow

Question 9

Correct

Mark 1.00 out of 1.00

Flag question

We have data

$$(1, 15), (3, 2), (6, 31), (9, 16)$$

Using this data find the first Lagrange polynomial

$$L_1$$

for the interpolating cubic and evaluate it at

$$x = 5$$

Select one:

a. -0.2

b. 0.05

c. -0.1 ✓

d. 0.1

The correct answer is: -0.1

Question 10

Correct

Mark 1.00 out of 1.00

Flag question

We have data

$$(1, 5), (2, 4), (3, 6), (4, 1)$$

Using this data find the first Lagrange polynomial

$$L_1$$

for the interpolating cubic and evaluate it at

$$x = 2.5$$

Select one:

a. -0.0625 ✓

b. 0.0011

c. 0.3625

d. -0.2143

The correct answer is: -0.0625

Question 11

Correct

Mark 1.00 out of 1.00

Flag question

We have data

$$(0, 12), (3, 31), (6, 9), (9, 50)$$

Find the term

$$b_3$$

in Newton's form of the interpolating cubic.

Select one:

a. -0.791

b. 0.446

c. -1.345

d. 0.642 ✓

The correct answer is: 0.642

Question **12**

Correct

Mark 1.00 out of 1.00

Flag question

We have data

$$(0, 2), (2, 5), (4, 1), (6, 9)$$

Find the term

$$b_3$$

in Newton's form of the interpolating cubic.

Select one:

- a. 0.396 ✓
- b. 0.267
- c. 0.301
- d. 0.422

The correct answer is: 0.396

Finish review