ITCS306_Numerical Method

Started on	Friday, 23 November 2018, 11:16 PM
State	Finished
Completed on	Saturday, 1 December 2018, 2:29 AM
Time taken	7 days 3 hours
Grade	**12.00** out of 12.00 (**100**%)

Question 1

Correct

Mark 1.00 out of 1.00

⚑ Flag question

What is the formula for Simpson's 1/3 rule?

Select one:

○ a.
$$\frac{(b-a)}{6}(f(a) + 4f(m) + f(b))$$
✔

○ b.
$$\frac{(b-a)}{6}(f(a) + 2f(m) + f(b))$$

○ c.
$$-\frac{(b-a)^2}{12n^2}(f'(b) - f'(a))$$

○ d.
$$\frac{(b-a)}{8}(f(x_0) + 3f(x_1) + 3f(x_2) + f(x_3))$$

The correct answer is:
$$\frac{(b-a)}{6}(f(a) + 4f(m) + f(b))$$

Question 2

Correct

Mark 1.00 out of 1.00

⚑ Flag question

Which formula could we use to estimate the error of using Simpson's 1/3 rule to estimate an integral?

Select one:

○ a.
$$-\frac{(b-a)^2}{12n^2}(f'(b) - f'(a))$$

○ b.
$$-\frac{(b-a)^2}{2880}(f^{(2)}(b) - f^{(2)}(a))$$

○ c.
$$-\frac{(b-a)^4}{6480}(f^{(3)}(b) - f^{(3)}(a))$$

◉ d.
$$-\frac{(b-a)^4}{2880}(f^{(3)}(b) - f^{(3)}(a))$$
✔

The correct answer is:
$$-\frac{(b-a)^4}{2880}(f^{(3)}(b) - f^{(3)}(a))$$

Question 3

Correct

Mark 1.00 out of 1.00

What is the formula for Simpson's 3/8 rule?

Select one:

○ a.

$$\frac{(b-a)}{8}(f(x_0) + 2f(x_1) + 2f(x_2) + f(x_3))$$

○ b.

$$-\frac{(b-a)^2}{12n^2}(f'(b) - f'(a))$$

○ c.

$$\frac{(b-a)}{6}(f(a) + 4f(m) + f(b))$$

⦿ d.

$$\frac{(b-a)}{8}(f(x_0) + 3f(x_1) + 3f(x_2) + f(x_3))$$

✔

The correct answer is:

$$\frac{(b-a)}{8}(f(x_0) + 3f(x_1) + 3f(x_2) + f(x_3))$$

Question 4

Correct

Mark 1.00 out of 1.00

⚑ Flag question

What formula could we use to estimate the error of Simpson's 3/8 rule?

Select one:

⦿ a.

$$-\frac{(b-a)^4}{6480}(f^{(3)}(b) - f^{(3)}(a))$$

✔

○ b.

$$\frac{(b-a)}{8}(f(x_0) + 3f(x_1) + 3f(x_2) + f(x_3))$$

○ c.

$$-\frac{(b-a)^2}{6480}(f^{(2)}(b) - f^{(2)}(a))$$

○ d.

$$-\frac{(b-a)^4}{2880}(f^{(3)}(b) - f^{(3)}(a))$$

The correct answer is:

$$-\frac{(b-a)^4}{6480}(f^{(3)}(b) - f^{(3)}(a))$$

Question 5

Correct

Mark 1.00 out of 1.00

⚑ Flag question

What is the formula for the composite trapezoid rule with

$$n$$

segments?

Select one:

○ a.

$$\frac{(b-a)}{3n}(f(a) + 4f(m) + f(b))$$

⦿ b.

$$\frac{(b-a)}{2n}(f(x_0) + 2\sum_{i=1}^{n-1} f(x_i) + f(x_n))$$

✔

○ c.

$$\frac{(b-a)}{2}(f(a) + f(b))$$

○ d.

$$\frac{(b-a)}{2n}(f(x_0) + 4\sum_{i=1}^{n-1} f(x_i) + f(x_n))$$

The correct answer is:

$$\frac{(b-a)}{2n}(f(x_0) + 2\sum_{i=1}^{n-1} f(x_i) + f(x_n))$$

Question 6

Correct

Mark 1.00 out of 1.00

⚑ Flag question

What is the name of the theorem that connects the derivative and the integral?

Select one:

- ⦿ a. The Fundamental Theorem of Calculus ✓
- ○ b. The Fundamental Theorem of Integrals and Derivatives
- ○ c. The Basic Theory of Integration
- ○ d. The Foundational Theorem of Differentiation

The correct answer is: The Fundamental Theorem of Calculus

Question 7

Correct

Mark 1.00 out of 1.00

⚑ Flag question

Which of the following is the name for a class of formulas used to estimate the value of integrals?

Select one:

- ○ a. Trapezoid Formulas
- ○ b. Simpson Equations
- ⦿ c. Newton-Cotes Formulas ✓
- ○ d. Newton-Raphson Formulas

The correct answer is: Newton-Cotes Formulas

Question 8

Correct

Mark 1.00 out of 1.00

⚑ Flag question

What is the formula for estimating the error of the trapezoid rule?

Select one:

- ⦿ a.

$$-\frac{1}{12}(f'(b) - f'(a))(b-a)^2$$

✓

- ○ b.

$$-\frac{(b-a)^4}{2880}(f^{(3)}(b) - f^{(3)}(a))$$

- ○ c.

$$-\frac{(b-a)^2}{2n^2}(f^{(3)}(b) - f^{(3)}(a))$$

- ○ d.

$$\frac{(b-a)(f(a) + f(b))}{2}$$

The correct answer is:

$$-\frac{1}{12}(f'(b) - f'(a))(b-a)^2$$

Question 9

Correct

Mark 1.00 out of 1.00

⚑ Flag question

A function f is such that

$$f(0) = 12.1$$

$$f(2) = 12.5$$

$$f(4) = 4.9$$

Use Simpson's 1/3 rule to estimate the value of

$$\int_0^4 f(x)dx.$$

Give your answer to 2 decimal places.

Answer: 44.67 ✓

The correct answer is: 44.67

Question 10

Correct

Mark 1.00 out of 1.00

⚑ Flag question

Suppose we have a function f and

$$f^{(3)}(1) = 8.2$$

$$f^{(3)}(5) = 5.2$$

Use these values to estimate the error

$$E_t$$

of an application of Simpson's 3/8 rule on the interval *(1, 5)*. Give your answer to 3 decimal places.

Answer: 0.119 ✓

The correct answer is: 0.119

Question 11

Correct

Mark 1.00 out of 1.00

⚑ Flag question

A function f is such that

$$f(0) = 9.4$$

$$f(1) = 3.3$$

$$f(2) = 9.2$$

Use the composite trapezoid rule with two segments to estimate the value of

$$\int_0^2 f(x)dx$$

Give your answer to 2 decimal places.

Answer: 12.60 ✓

The correct answer is: 12.60

Question 12

Correct

Mark 1.00 out of 1.00

⚑ Flag question

A function f is such that

$$f(2) = 18.2$$

$$f(3.5) = 6.5$$

$$f(5) = 15.5$$

Use Simpson's 1/3 rule to estimate the value of

$$\int_2^5 f(x)dx.$$

Give your answer to 2 decimal places.

Answer: 29.85 ✓

The correct answer is: 29.85

Finish review