Started on	Saturday, 20 November 2021, 1:20 AM
State	Finished
Completed on	Saturday, 20 November 2021, 1:29 AM
Time taken	8 mins 40 secs
Grade	**12.00** out of 12.00 (**100**%)

Question **1**

Correct

Mark 1.00 out of 1.00

A function f is such that

$$f(2) = 13.4$$

$$f(5) = 6$$

Use the trapezoid rule to estimate the value of $\int_2^5 f(x)dx$. Give your answer to 2 decimal places.

Answer: 29.09 ✔

The correct answer is: 29.10

Question **2**

Correct

Mark 1.00 out of 1.00

A function f is such that

$$f(0) = 3.9$$

$$f(2) = 4$$

$$f(4) = 5$$

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: 16.60 ✔

The correct answer is: 16.60

Question **3**

Correct

Mark 1.00 out of 1.00

What is the formula for the composite trapezoid rule with n segments?

Select one:

○ a.

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

○ b.

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

○ c.

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

○ 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 **4**

Correct

Mark 1.00 out of 1.00

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

Select one:

○ a.   Simpson Equations

○ b.   Trapezoid Formulas

◉ c.   Newton-Cotes Formulas   ✔

○ d.   Newton-Raphson Formulas

The correct answer is: Newton-Cotes Formulas

Question **5**

Correct

Mark 1.00 out of 1.00

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

Select one:

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

The correct answer is: The Fundamental Theorem of Calculus

Question **6**

Correct

Mark 1.00 out of 1.00

Suppose we have a function f and $$f^{(3)}(1) = 6.7$$ $$f^{(3)}(5) = 4.3$$ Use these values to calculate the error estimate E_a of an application of Simpson's 3/8 rule on the interval *(1, 5)*. Give your answer to 3 decimal places.

Answer: | 0.095 | ✔

The correct answer is: 0.095

Question **7**

Correct

Mark 1.00 out of 1.00

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

Select one:

- ○ a. $$\frac{(b-a)}{6}(f(a) + 2f(m) + f (b))$$
- ◉ b. $$\frac{(b-a)}{6}(f(a) + 4f(m) + f (b))$$ ✔
- ○ 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 **8**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. $$-\frac{(b-a)^2}{2n^2}(f^{(3)}(b)-f^{(3)}(a))$$
- b. $$-\frac{1}{12}(f'(b)-f'(a))(b-a)^2 $$ ✔
- c. $$ \frac{(b-a)(f(a)+f(b))}{2}$$
- d. $$-\frac{(b-a)^4}{2880}(f^{(3)}(b)-f^{(3)}(a))$$

The correct answer is: $$-\frac{1}{12}(f'(b)-f'(a))(b-a)^2 $$

Question **9**

Correct

Mark 1.00 out of 1.00

A function *f* is such that $$f(0)=2.8$$ $$f(1)=2.7$$ $$f(2)=7.8$$ 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: 8   ✔

The correct answer is: 8.00

Question **10**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. $$-\frac{(b-a)^2}{6480}(f^{(2)}(b) - f^{(2)}(a))$$
- b. $$-\frac{(b-a)^4}{6480}(f^{(3)}(b) - f^{(3)}(a))$$ ✔
- c. $$\frac{(b-a)}{8}(f(x_0)+3f(x_1)+3f(x_2)+f(x_3))$$
- 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 **11**

Correct

Mark 1.00 out of 1.00

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

Select one:

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

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

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

Question **12**

Correct

Mark 1.00 out of 1.00

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

Select one:

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

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

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

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

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

◄ Week 12 Quiz

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