



Started on

Monday, 19 February 2024, 9:20 PM

State

Finished

Completed on

Saturday, 24 February 2024, 3:01 PM

Time taken

4 days 17 hours

Marks

11.00/11.00

Grade

10.00 out of 10.00 (100%)

Question 1

Complete

Mark 1.00 out of 1.00

Express the integrand as a sum of partial fractions and evaluate the integral.

$$\int \frac{140}{t^3 + 3t^2 - 10t} dt$$

Select one:

- ☐ A. $-\frac{14}{t} + 10\ln|t-2| + 4\ln|t+5| + C$
- ☐ B. $-4\ln|t| + 10\ln|t-2| - 4\ln|t+5| + C$
- ☒ C. $-14\ln|t| + 10\ln|t-2| + 4\ln|t+5| + C$
- ☐ D. $-14\ln|t| + 10\ln|t^2-2| + C$

Question 2

Complete

Mark 1.00 out of 1.00

Express the integrand as a sum of partial fractions and evaluate the integral.

$$\int \frac{dx}{x^2(x^2 - 4)}$$

Select one:

- ☐ A. $\frac{1}{8x} + \frac{1}{16} \ln \left| \frac{x-2}{x+2} \right| + C$
- ☐ B. $\frac{1}{4x} + \frac{1}{8} \ln \left| \frac{x-2}{x+2} \right| + C$
- ☐ C. $\frac{1}{4x} + \frac{1}{16} \ln \left| \frac{x+2}{x-2} \right| + C$
- ☒ D. $\frac{1}{4x} + \frac{1}{16} \ln \left| \frac{x-2}{x+2} \right| + C$

Question 3

Complete

Mark 1.00 out of 1.00

Express the integrand as a sum of partial fractions and evaluate the integral.

$$\int \frac{6x^2 + x + 16}{(x^2 + 3)(x - 2)} dx$$

Select one:

- ☐ A. $6 \ln |x-2| + \tan^{-1} \left(\frac{x\sqrt{3}}{3} \right) + C$
- ☐ B. $6 \ln |x-2| + \frac{1}{3} \tan^{-1} \left(\frac{x}{3} \right) + C$
- ☒ C. $6 \ln |x-2| + \frac{\sqrt{3}}{3} \tan^{-1} \left(\frac{x\sqrt{3}}{3} \right) + C$
- ☐ D. $\ln |x-2| + \frac{\sqrt{3}}{3} \tan^{-1} \left(\frac{x\sqrt{3}}{3} \right) + C$

Question 4

Complete

Mark 1.00 out of 1.00

Evaluate the integral by first performing long division on the integrand and then writing the proper fraction as a sum of partial fractions.

$$\int \frac{3x^3 + 3x^2 + 6}{x^2 + x} dx$$

Select one:

- ☒ A. $\frac{3}{2}x^2 - 6 \ln |x+1| + 6 \ln |x| + C$
- ☐ B. $\frac{3}{2}x^2 + 6 \ln |x-1| - 6 \ln |x| + C$
- ☐ C. $3x^2 + 6 \ln |x+1| - 6 \ln |x| + C$
- ☐ D. $6 \ln |x+1| - 6 \ln |x| + C$

Question 5

Complete

Mark 1.00 out of 1.00

Evaluate the improper integral.

$$\int_{-8}^1 \frac{dx}{x^{2/3}}$$

Select one:

- ☐ A. 3
- ☐ B. 0
- ☒ C. 9
- ☐ D. -3

Question 6

Complete

Mark 1.00 out of 1.00

Evaluate the integral.

$$\int 5x \sin x \, dx$$

Select one:

- ☒ A. $5 \sin x - 5x \cos x + C$
- ☐ B. $5 \sin x + 5x \cos x + C$
- ☐ C. $5 \sin x - x \cos x + C$
- ☐ D. $5 \sin x - 5 \cos x + C$

Question 7

Complete

Mark 1.00 out of 1.00

Evaluate the improper integral.

$$\int_0^{\infty} e^{-x} \cos 3x \, dx$$

Select one:

- ☐ A. $\frac{3}{10}$
- ☐ B. Diverges
- ☒ C. $\frac{1}{10}$
- ☐ D. 1

Question 8

Complete

Mark 1.00 out of 1.00

Evaluate the integral.

$$\int (x^2 - 4x) e^x \, dx$$

Select one:

- ☐ A. $\frac{1}{3}x^3e^x - 2x^2e^x + C$
- ☐ B. $e^x[x^2 - 6x - 6] + C$
- ☐ C. $e^x[x^2 - 4x + 4] + C$
- ☒ D. $e^x[x^2 - 6x + 6] + C$

Question 9

Complete

Mark 1.00 out of 1.00

Evaluate the improper integral or state that it is divergent.

$$\int_0^{\infty} \frac{2 \, dx}{49 + x^2}$$

Select one:

- ☐ A. $\pi + 7$
- ☐ B. 0
- ☐ C. $\frac{\pi}{49}$
- ☒ D. $\frac{\pi}{7}$

Question 10

Complete

Mark 1.00 out of 1.00

Evaluate the improper integral or state that it is divergent.

$$\int_1^{\infty} \frac{1}{x(x^2 + 5)} dx$$

Select one:

- ☐ A. Divergent
- ☒ B. $\frac{\ln 6}{10}$
- ☐ C. $\ln 6$
- ☐ D. $\ln 4$

Question 11

Complete

Mark 1.00 out of 1.00

Evaluate the improper integral.

$$\int_0^2 \frac{dx}{\sqrt{4-x^2}}$$

Select one:

- ☐ A. 4
- ☐ B. $\frac{\pi}{4}$
- ☐ C. 1
- ☒ D. $\frac{\pi}{2}$

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