MA126 Exam 1 Version 1

Name:

1) Find the form of the partial fractions expansion for the following integrand. **DO NOT** determine the values of the coefficients.

$$\frac{x^2+2x+1}{x(x+1)^2(x^2+2)^2}$$

2) Evaluate the integral

$$\int \frac{dx}{x[1+(\ln x)^2]}$$

3) Find the area bounded by the curves

$$f(x) = \cos\frac{x}{2} \quad \text{and} \quad g(x) = \sin\frac{x}{2}$$

and the vertical lines $x = 0$ and $x = 2\pi$.

4) Evaluate the integral

$$\int_0^2 |x^2 - x|\, dx$$

5) Find the volume of the solid obtained by rotating the area bounded by the graph of

$$f(x) = \frac{1}{\sqrt{1-x^4}}$$

the x-axis, and the vertical lines $x = 0$ and $x = 1$ about the y-axis

6) Evaluate the integral

$$\int x^4 \sin 2x$$

7) Evaluate the integral

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

8) Find the volume of the solid obtained by rotating the area bounded by the graph of $f(x) = \sec^2 x \tan^2 x$, the x-axis, and the vertical lines $x = 0$ and $x = \pi/4$ about the x-axis.

9) Find the work done by moving an object from $x = 0$ to $x = 1$ if the force at a distance x from the origin is

$$\frac{e^{\sqrt{x}}}{\sqrt{x}}$$

10) Evaluate the integral (including any constants)

$$\int \frac{2x^2 + x + 1}{x^3 + x}\, dx$$

Integration Formulas

Constants of integration have been omitted.

$$\int \sec^2 x \, dx = \tan x \tag{1}$$

$$\int \csc^2 x \, dx = -\cot x \tag{2}$$

$$\int \sec x \tan x \, dx = \sec x \tag{3}$$

$$\int \csc x \cot x \, dx = -\csc x \tag{4}$$

$$\int \sec x \, dx = \ln|\sec x + \tan x| \tag{5}$$

$$\int \csc x \, dx = \ln|\csc x - \cot x| \tag{6}$$

$$\int \tan x \, dx = \ln|\sec x| \tag{7}$$

$$\int \cot x \, dx = \ln|\sin x| \tag{8}$$

$$\int \frac{dx}{x^2 + a^2} = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) \tag{9}$$

$$\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\left(\frac{x}{a}\right) \tag{10}$$

$$\int \frac{dx}{x^2 - a^2} = \frac{1}{2a} \ln\left|\frac{x - a}{x + a}\right| \tag{11}$$

$$\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \ln\left|x + \sqrt{x^2 \pm a^2}\right| \tag{12}$$

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MA126 Exam 1 Version 2

Name:

1) Find the volume of the solid obtained by rotating the area bounded by the graph of

$$f(x) = \frac{1}{\sqrt{1-x^4}}$$

the x-axis, and the vertical lines $x = 0$ and $x = 1$ about the y-axis

2) Find the work done by moving an object from $x = 0$ to $x = 1$ if the force at a distance x from the origin is

$$\frac{e^{\sqrt{x}}}{\sqrt{x}}$$

3) Find the area bounded by the curves

$$f(x) = \cos\frac{x}{2} \quad \text{and} \quad g(x) = \sin\frac{x}{2}$$

and the vertical lines $x = 0$ and $x = 2\pi$.

4) Evaluate the integral

$$\int_0^2 |x^2 - x|\, dx$$

5)

Find the form of the partial fractions expansion for the following integrand. **DO NOT** determine the values of the coefficients.

$$\frac{x^2 + 2x + 1}{x(x+1)^2(x^2+2)^2}$$

6) Evaluate the integral

$$\int x^4 \sin 2x$$

7) Evaluate the integral

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

8) Find the volume of the solid obtained by rotating the area bounded by the graph of $f(x) = \sec^2 x \tan^2 x$, the x-axis, and the vertical lines $x = 0$ and $x = \pi/4$ about the x-axis.

9) Evaluate the integral

$$\int \frac{dx}{x[1+(\ln x)^2]}$$

10) Evaluate the integral (including any constants)

$$\int \frac{2x^2+x+1}{x^3+x}\,dx$$

Integration Formulas

Constants of integration have been omitted.

$$\int \sec^2 x \, dx = \tan x \tag{13}$$

$$\int \csc^2 x \, dx = -\cot x \tag{14}$$

$$\int \sec x \tan x \, dx = \sec x \tag{15}$$

$$\int \csc x \cot x \, dx = -\csc x \tag{16}$$

$$\int \sec x \, dx = \ln|\sec x + \tan x| \tag{17}$$

$$\int \csc x \, dx = \ln|\csc x - \cot x| \tag{18}$$

$$\int \tan x \, dx = \ln|\sec x| \tag{19}$$

$$\int \cot x \, dx = \ln|\sin x| \tag{20}$$

$$\int \frac{dx}{x^2 + a^2} = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) \tag{21}$$

$$\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\left(\frac{x}{a}\right) \tag{22}$$

$$\int \frac{dx}{x^2 - a^2} = \frac{1}{2a} \ln\left|\frac{x - a}{x + a}\right| \tag{23}$$

$$\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \ln\left|x + \sqrt{x^2 \pm a^2}\right| \tag{24}$$

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