professor **MFalk_137**

WeBWorK assignment number Exercises_4

This is an exercise assignment, treated differently from ordinary WeBWork assignments. The WeBWork due date is the same as the opening date, so that answers are available to students immediately. Students are to print the assignment and work the problems on paper. That work will be collected periodically and graded for effort. Exercises are worth 20 points (4% of the overall grade).

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1. **(1 pt) Library/maCalcDB/setIntegrals5Trig/sc5_5_98.pg**
Evaluate the definite integral.

$$\int_0^{\pi/2} \sin^5 x \cos^{14} x \, dx$$

_____

Correct Answers:

- `0.00165118679050567`

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2. **(1 pt) Library/maCalcDB/setIntegrals5Trig/sc5_5_99.pg**
Evaluate the indefinite integral.

$$\int 86 \cos^3(11x)\, dx$$

_____

Correct Answers:

- `86/11*sin(11*x) - 86/(3*11)*(sin(11*x))**3`

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3. **(1 pt) Library/maCalcDB/setIntegrals5Trig/ur_in_5_6.pg**
Evaluate the indefinite integral.

$$\int 54x^5 \sec^4(x^6) dx$$

_____ $+C$

Correct Answers:

- `(9/3)*sin(x^6)/(cos(x^6))^3+(2*9/3)*tan(x^6)`

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4. **(1 pt) Library/ma123DB/set2/s7_2_13.pg**
Evaluate the definite integral.

$$\int_0^{\pi/2} \sin^5 x \cos^8 x \, dx$$

Answer: _____

Correct Answers:

- `1/(8 + 1) - 2/(8 + 3) + 1/(8 + 5)`

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5. **(1 pt) Library/ma123DB/set2/s7_2_27.pg**
Evaluate the indefinite integral.

$$\int \tan^3(2x)\sec(2x)\, dx$$

Answer: _____ $+C$

Correct Answers:

- `-(-(cos(2*x))^(-3)/3+1/cos(2*x))/2`

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6. **(1 pt) Library/maCalcDB/setIntegrals5Trig/osu_in_5_7.pg**

$\int_0^{\pi/7} \sin^4(7x)\, dx =$ _____

Correct Answers:

- `0.168299606464286`

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7. **(1 pt) Library/ma123DB/set2/s7_2_42.pg**
Evaluate

$$\int_0^{\pi/2} \sin(2x)\sin(x)\, dx$$

Answer: _____

Correct Answers:

- `( 2*(sin(pi/2))^3 )/3`

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8. **(1 pt) Library/ma123DB/set2/s7_2_8.pg**
Evaluate the indefinite integral.

$$\int 34\cos^2(15x)\, dx$$

Answer: _____ $+C$

Correct Answers:

- `34*x/2 + 34*sin(2*15*x)/(4*15)`

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9. **(1 pt) Library/Union/setIntTrigonometric/an8_3_08.pg**
Evaluate the indefinite integral.

$\int \tan^3(x)\sec^5(x)\, dx =$ _____ $+C.$

Correct Answers:

- `(1/7)(sec(x))^7 - (1/5)(sec(x))^5`

10. **(1 pt) Library/maCalcDB/setIntegrals10InvTrig/invtrigs2.pg**
Evaluate the definite integral.

$$\int_0^6 \frac{1}{\sqrt{16+x^2}}dx$$

Correct Answers:

- 1.19476321728711

11. **(1 pt) Library/maCalcDB/setIntegrals10InvTrig/ur_in_10_1.pg**
For each of the indefinite integrals below, choose which of the following substitutions would be most helpful in evaluating the integral. Enter the appropriate letter (A,B, or C) in each blank. DO NOT EVALUATE THE INTEGRALS.

A. $x = 5\tan\theta$
B. $x = 5\sin\theta$
C. $x = 5\sec\theta$

___1. $\int x^2\sqrt{25+x^2}\,dx$
___2. $\int \frac{x^2\,dx}{\sqrt{25-x^2}}$
___3. $\int (x^2-25)^{5/2}\,dx$
___4. $\int \sqrt{x^2-25}\,dx$
___5. $\int \frac{dx}{(25+x^2)^3}$

Correct Answers:

- A
- B
- C
- C
- A

12. **(1 pt) Library/ma123DB/set2/s7_3_2.pg**
Evaluate the definite integral

$$\int_0^{9\sqrt{3}/2} \sqrt{81-x^2}\,dx$$

Answer: _____

Correct Answers:

- (81*pi)/(2*3) + (81/8)*(3)^(1/2)

13. **(1 pt) Library/ma123DB/set2/s7_3_22.pg**
Evaluate the definite integral.

$$\int_0^{\frac{1}{2}} \frac{5}{1+4x^2}dx$$

Answer: _____

Correct Answers:

- 1/2 * 5 * 0.785398163397448

14. **(1 pt) Library/ma123DB/set3/s7_4_1.pg**
Write out the form of the partial fraction decomposition of the function appearing in the integral:

$$\int \frac{-3x-122}{x^2+2x-48}\,dx$$

Determine the numerical values of the coefficients, A and B, where $A \le B$ and

$$\frac{-3x-122}{x^2+2x-48} = \frac{A}{denominator} + \frac{B}{denominator}$$

$A =$ _____ $B =$ _____

Correct Answers:

- -10
- 7

15. **(1 pt) Library/ma123DB/set3/s7_4_15.pg**
Evaluate the integral.

$$\int_{-3}^{3} \frac{x^3-4}{(x+7)(x+6)}dx$$

Answer: _____

Correct Answers:

- -1.74181976296375

16. **(1 pt) Library/ma123DB/set3/s7_4_18.pg**
Evaluate the integral.

$$\int_{-1}^{0} \frac{7x+23}{x^2+8x+15}dx$$

Answer: _____

Correct Answers:

- 1*ln(1.5)+6*ln((2+3)/(2+2))

17. **(1 pt) Library/ma123DB/set3/s7_4_2.pg**
Write out the form of the partial fraction decomposition of the function:

$$Q = \int_3^{10} \frac{1x}{x^2+5x+6}dx$$

Determine the numerical values of the coefficients, A and B, where $B \leq A$ and

$$\frac{1x}{x^2+5x+6} = \frac{A}{denominator} + \frac{B}{denominator}$$

$A =$ _____ $B =$ _____
Correct Answers:

- 3*1
- -2*1

18. **(1 pt) Library/ma123DB/set3/s7_4_27.pg**
Evaluate the indefinite integral.

$$\int \frac{-2x^3-6x^2+x+6}{x^4-2x^3}dx$$

Answer: _____ $+C$
Correct Answers:

- 2*ln(abs(x)) - -2/x - -3/(2*x*x) + -4*ln(abs(x+-2))

19. **(1 pt) Library/ma123DB/set3/s7_4_31.pg**
The form of the partial fraction decomposition of a rational function is given below.

$$\frac{-2x^2-3x-23}{(x+5)(x^2+4)} = \frac{A}{x+5} + \frac{Bx+C}{x^2+4}$$

$A =$ ____ $B =$ ____ $C =$ ____

Now evaluate the indefinite integral.

$$\int \frac{-2x^2-3x-23}{(x+5)(x^2+4)}dx$$

Answer: _____ $+C$
Correct Answers:

- -2
- 0
- -3
- -2*ln(abs(x+5))+-3*arctan(x/2)/2

20. **(1 pt) Library/Utah/AP_Calculus_I/set12_Further_Techniques_and_Applications_/1220s14p3.pg**
Use the method of partial fraction decomposition to perform the following integration.
$\int \frac{2x^2-x-20}{x^2+x-6}\mathrm{d}x =$ _____.
Hint: $2x^2-x-20 = 2(x^2+x-6)-3x-8$

Solution: Write

$$I = \int \frac{2x^2-x-20}{x^2+x-6}\mathrm{d}x$$

$$\frac{2(x^2+x-6)-3x-8}{x^2+x-6} = 2 - \frac{3x-8}{x^2+x-6}$$

$$\frac{3x-8}{x^2+x-6} = \frac{3x-8}{(x+3)(x-2)} = \frac{A}{x+3} + \frac{B}{x-2}$$

$\Longrightarrow$

$$3x+8 = A(x-2)+B(x+3)$$

$\Longrightarrow$

$$x = -3 \Longrightarrow A = 1/5$$

$$x = 3 \Longrightarrow B = 14/5$$

$\Longrightarrow$

$$I = \left(\int 2\mathrm{d}x - 1/5\int \frac{\mathrm{d}x}{x+3} - 14/5\int \frac{\mathrm{d}x}{x-2}\right)$$

$\Longrightarrow$

$$I = 2x - 1/5\left(\ln|x+3| - 14\ln|x-2| + C\right)$$

Correct Answers:

- 2x - 1/5*(ln(x+3) + 14*ln(x-2))

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