

## Assignment 10.1 POWERS\_OF\_SINE\_AND\_COSINE due 12/31/2012 at 08:00am PST

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$$\int \sin^2 y dy = \underline{\hspace{2cm}}$$

Remember to include the upper case +C in your answer.

*Correct Answers:*

- $1/2*y-1/4*\sin(2*y)+C$

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$$\int \cos^2 z dz = \underline{\hspace{2cm}}$$

Remember to include the upper case +C in your answer.

*Correct Answers:*

- $1/2*z+1/4*\sin(2*z)+C$

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$$\int \cos^3 y dy = \underline{\hspace{2cm}}$$

Remember to include the upper case +C in your answer.

*Correct Answers:*

- $\sin(y)-1/3*[\sin(y)]^3+C$

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$$\int \sin^3 x dx = \underline{\hspace{2cm}}$$

Remember to include the upper case +C in your answer.

*Correct Answers:*

- $-\cos(x)+1/3*\cos(x)^3+C$

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$$\int_0^{\pi/2} \sin^2 x dx = \underline{\hspace{2cm}}$$

*Correct Answers:*

- $\pi/4$

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$$\int_0^{\pi/2} \cos^2 t dt = \underline{\hspace{2cm}}$$

*Correct Answers:*

- $\pi/4$

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**7. (1 pt) Library/Rochester/setIntegrals5Trig/S07.02.TrigIntegrals.PTP17.pg**  
Evaluate the indefinite integral.

$$\int \tan^2 x dx$$

Answer:  $\underline{\hspace{2cm}}$  + C*Correct Answers:*

- $\tan(x) - x$

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**8. (1 pt) Library/Rochester/setIntegrals5Trig/S07.02.TrigIntegrals.PTP18.pg**  
Evaluate the indefinite integral.

$$\int \tan^4 x dx$$

Answer:  $\underline{\hspace{2cm}}$  + C*Correct Answers:*

- $\tan(x)^3/3 - \tan(x) + x$

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**9. (1 pt) UCR/270.setIntegrals5Trig.sc5.5.97.UCR.pg**  
Evaluate the definite integral.

$$\int_3^6 \sin^2(x) \cos^2(x) dx$$

*Correct Answers:*

- 0.386531420125193

## Assignment 10.2\_TRIGONOMETRIC\_SUBSTITUTION due 12/31/2012 at 08:00am PST

**1. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.2.pg**

Evaluate the integral using the indicated trigonometric substitution.

$$\int -10x^3 \sqrt{9-x^2} dx, \quad x = 3 \sin(\theta)$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-10/5 * (9-x^2)^{(5/2)} - 3 * -10 * (9-x^2)^{(3/2)} + C + c$

**2. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.4.pg**

Evaluate the integral

$$\int_0^{2\sqrt{3}} \frac{-4x^3}{\sqrt{16-x^2}} dx$$

Correct Answers:

- $-4 * 40/3$

**3. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.9.pg**

Evaluate the integral

$$\int \frac{4}{\sqrt{x^2+16}} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $4 * \ln(x + \sqrt{x^2+16}) + C + c$

**4. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.10.pg**

Evaluate the integral

$$\int \frac{3t^5}{\sqrt{t^2+2}} dt$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $3 * (1/5 * t^4 * (t^2+2)^{(1/2)} - 8/15 * t^2 * (t^2+2)^{(1/2)} + 32/15 * (t^2+2)^{(3/2)}) + C + c$

**5. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.11.pg**

Evaluate the integral

$$\int 5\sqrt{1-4x^2} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $5/4 * (\arcsin(2*x) + 2*x*\sqrt{1-4*x^2}) + C + c$

**6. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.12.pg**

Evaluate the integral

$$\int_0^1 8x\sqrt{x^2+4} dx$$

Correct Answers:

- $8 * (5/3 * 5^{(1/2)} - 8/3)$

**7. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.13.pg**

Evaluate the integral

$$\int \frac{1\sqrt{x^2-9}}{x^3} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $1/18 * 1/x^2 * (x^2-9)^{(3/2)} - 1/18 * 1 * (x^2-9)^{(1/2)} - 1/6 * 1 * \arctan(3/x) + C + c$

**8. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.14.pg**

Evaluate the integral

$$\int \frac{4}{u\sqrt{5-u^2}} du$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $4/\sqrt{5} * \ln(\frac{\sqrt{5}-\sqrt{5-u^2}}{u}) + C + c$

**9. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.16.pg**

Evaluate the integral

$$\int \frac{2}{x^2\sqrt{16x^2-9}} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $2/9 * \arcsin(\frac{\sqrt{16*x^2-9}}{4*x}) + C + c$

**10. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.20.pg**

Evaluate the integral

$$\int \frac{-9t}{\sqrt{25-t^2}} dt$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-1 * -9 * (25-t^2)^{(1/2)} + C + c$

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**11. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.22.pg**

Evaluate the integral

$$\int_0^1 9\sqrt{x^2+1} dx$$

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*Correct Answers:*

- $9/2 * (\sqrt{2} + \ln(1 + \sqrt{2}))$

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**12. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.23.pg**

Evaluate the integral

$$\int -3\sqrt{5+4x-x^2} dx$$

Note: Use an upper-case "C" for the constant of integration.

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*Correct Answers:*

- $-3 * (-1/4 * (-2*x+4) * (5+4*x-x^2)^{(1/2)} + 9/2 * \arcsin(-2/3 + 1/3*x)) + C + c$

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**13. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.24.pg**

Evaluate the integral

$$\int \frac{-9}{\sqrt{t^2-6t+13}} dt$$

Note: Use an upper-case "C" for the constant of integration.

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*Correct Answers:*

- $-9 * \ln(\text{abs}(\sqrt{t^2-6*t+13}) + t - 3) + C + c$

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**14. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.25.pg**

Evaluate the integral

$$\int \frac{8}{\sqrt{9x^2+6x-8}} dx$$

Note: Use an upper-case "C" for the constant of integration.

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*Correct Answers:*

- $8/3 * \ln(\text{abs}(\sqrt{9*x^2+6*x-8}) + 3*x+1) + C + c$

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**15. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.30.pg**

Evaluate the integral

$$\int_0^{\pi/2} \frac{3 \cos t}{\sqrt{1 + \sin^2(t)}} dt$$

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*Correct Answers:*

- $\ln(1 + 2^{(1/2)}) * 3$

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**16. (1 pt) Library/UCSB/Stewart5.7.3/Stewart5.7.3.34.pg**Find the area of the region bounded by the hyperbola  $9x^2 - 4y^2 = 36$  and the line  $x = 3$ .

Area = \_\_\_\_\_

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*Correct Answers:*

- $9 * \sqrt{5} / 2 - 6 * \ln((3 + \sqrt{5}) / 2)$

## Assignment 10.3 INTEGRATION\_BY PARTS due 12/31/2012 at 08:00am PST

**1. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.2.pg**

Evaluate the integral using integration by parts with the indicated choices of  $u$  and  $dv$ :

$$\int 4t \sec^2(t) dt; \quad u = 4t, \quad dv = \sec^2(t) dt$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $4t \tan(t) - 4 \ln(|\sec(t)|) + C + c$

**2. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.4.pg**

Evaluate the integral

$$\int x e^{-2x} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $x/2 - \exp(-2x)/2 + C + c$

**3. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.8.pg**

Evaluate the integral

$$\int 2x^2 \cos(mx) dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $2/m^3 (m^2 x^2 \sin(mx) - 2x \cos(mx) + 2 \sin(mx)) + C + c$

**4. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.10.pg**

Evaluate the integral

$$\int 1 \sin^{-1}(x) dx$$

Note: Use an upper-case "C" for the constant of integration. Also, if you need to use the inverse sine function in your answer, use "asin()" or "arcsin()".

Correct Answers:

- $x \arcsin(x) + \sqrt{1-x^2} + C + c$

**5. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.12.pg**

Evaluate the integral

$$\int -10p^5 \ln(p) dp$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $1/6 - 10p^6 \ln(p) - 1/36 - 10p^6 + C + c$

**6. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.14.pg**

Evaluate the integral

$$\int -5t^3 e^t dt$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-5 \exp(t) (t^3 - 3t^2 + 6t - 6) + C + c$

**7. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.16.pg**

Evaluate the integral

$$\int e^{-5t} \cos(3t) dt$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-5 / ((-5)^2 + (3)^2) \exp(-5t) \cos(3t) + 3 / ((-5)^2 + (3)^2) \exp(-5t) \sin(3t) + C + c$

**8. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.19.pg**

Evaluate the following integral:

$$\int_0^{\pi} 7t \sin(3t) dt$$

Correct Answers:

- $7\pi/3$

**9. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.17.pg**

Evaluate the integral

$$\int -2y \sinh(y) dy$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-2y \cosh(y) - 1 - 2 \sinh(y) + C + c$

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**10. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.20.pg**

Evaluate the following integral:

$$\int_0^1 2(x^2 + 1)e^{-x} dx$$

Correct Answers:

- $-6*2/\exp(1)+3*2$

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**11. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.30.pg**

Evaluate the integral

$$\int_0^1 \frac{1r^3}{\sqrt{4+r^2}} dr$$

Correct Answers:

- $1*(16/3-7/3*\sqrt{5})$

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**12. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.33.pg**

First make a substitution and then use integration by parts to evaluate the integral

$$\int -2 \sin(\sqrt{x}) dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-2*-2*\sqrt{x}*\cos(\sqrt{x})+2*-2*\sin(\sqrt{x})+C+c$

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**13. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.36.pg**

First make a substitution and then use integration by parts to evaluate the integral

$$\int -4x^5 e^{x^2} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-4/2*\exp(x^2)*(x^4-2*x^2+2)+C+c$

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**14. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.52.pg**

Find the area of the region bounded by the curves  $y = 5\ln(x)$  and  $y = x\ln(x)$ .

Area = \_\_\_\_\_

Correct Answers:

- $25/2*\ln(5)-14$

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**15. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.56.pg**

Use the method of cylindrical shells to find the volume of the solid generated by rotating the region bounded by the curves  $y = e^x$ ,  $y = e^{-x}$ , and  $x = 1$  about the  $y$ -axis.

Volume = \_\_\_\_\_

Correct Answers:

- $4*pi/\exp(1)$

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**16. (1 pt) Library/UCSB/Stewart5.7.1/Stewart5.7.1.58.pg**

Use the method of cylindrical shells to find the volume of the solid generated by rotating the region bounded by the curves  $y = e^x$ ,  $x = 0$ , and  $y = \pi$  about the  $x$ -axis.

Volume = \_\_\_\_\_

Correct Answers:

- $pi^3*\ln(pi)-1/2*pi^3+pi/2$

**1. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.10.pg**

Evaluate the integral

$$\int \frac{1}{(t+4)(t-1)} dt$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $1 * (-1/5 * \ln(\text{abs}(t+4)) + 1/5 * \ln(\text{abs}(t-1))) + C + c$

**2. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.12.pg**

Evaluate the integral

$$\int_0^1 \frac{-5x+5}{x^2+3x+2} dx$$

Correct Answers:

- $-5 * -5 * \ln(2) + 3 * -5 * \ln(3)$

**3. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.15.pg**

Evaluate the integral

$$\int_0^1 \frac{-12x-18}{(x+1)^2} dx$$

Correct Answers:

- $-6 * (2 * \ln(2) + 1/2)$

**4. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.20.pg**

Evaluate the integral

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

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-2 * (9/25 * \ln(\text{abs}(x-3)) + 4/(5 * (x+2)) + 16/25 * \ln(\text{abs}(x+2))) + C + c$

**5. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.25.pg**

Evaluate the integral

$$\int \frac{3}{(x-1)(x^2+9)} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-1/20 * 3 * \ln(x^2+9) - 1/30 * 3 * \arctan(1/3 * x) + 1/10 * \ln(x-1) * 3 + C + c$

**6. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.26.pg**

Evaluate the integral

$$\int \frac{2x^2 - 2x + 12}{x^3 + 3x} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $1/2 * \ln(x^2+3) * 2 - 1/6 * \ln(x^2+3) * 12 + 1/3 * -2 * 3^{1/2} * \arctan(1/3)$

**7. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.28.pg**

Evaluate the integral

$$\int \frac{-8x^2 + 16x + 8}{(x-1)^2(x^2+1)} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-8 * (\ln(\text{abs}(x-1)) + 1/(x-1) - 1/2 * \ln(x^2+1) + \text{atan}(x)) + C + c$

**8. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.34.pg**

Evaluate the integral

$$\int \frac{7x^3}{x^3+1} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $7 * (x-1/3 * \ln(\text{abs}(x+1)) + 1/6 * \ln(x^2-x+1) - 1/\sqrt{3} * \text{atan}((2*x-1)/\sqrt{3})) + C + c$

**9. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.39.pg**

Make a substitution to express the integrand as a rational function and then evaluate the integral

$$\int \frac{-9}{x\sqrt{x+1}} dx$$

Note: Use an upper-case "C" for the constant of integration.

Correct Answers:

- $-9 * (\ln(\text{abs}(\sqrt{x+1}-1)/\text{abs}(\sqrt{x+1}+1))) + C + c$

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**10. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.42.pg**

Make a substitution to express the integrand as a rational function and then evaluate the integral

$$\int_0^1 \frac{8}{1 + \sqrt[3]{x}} dx$$

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*Correct Answers:*

- $8 \cdot 3 \cdot (\ln(2) - 1/2)$

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**11. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.46.pg**

Make a substitution to express the integrand as a rational function and then evaluate the integral

$$\int \frac{4}{\sqrt[3]{x} + \sqrt[4]{x}} dx$$

Hint: Substitute  $u = \sqrt[12]{x}$ .

Note: Use an upper-case "C" for the constant of integration.

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*Correct Answers:*

- $4 \cdot (3/2 \cdot x^{2/3} - 12/7 \cdot x^{7/12} + 2 \cdot x^{1/2} - 12/5 \cdot x^{5/12} + 3 \cdot x^{1/3} - 4 \cdot x^{1/4}) + C$

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**12. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.48.pg**

Make a substitution to express the integrand as a rational function and then evaluate the integral

$$\int \frac{3 \cos(x)}{\sin^2(x) + \sin(x)} dx$$

Note: Use an upper-case "C" for the constant of integration.

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*Correct Answers:*

- $3 \cdot (\ln(\sin(x)) - \ln(1 + \sin(x))) + C$

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**13. (1 pt) Library/UCSB/Stewart5.7.4/Stewart5.7.4.50.pg**

Use integration by parts and the technique of partial fractions to evaluate the integral

$$\int 1x \arctan(x) dx$$

Note: Use an upper-case "C" for the constant of integration.

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*Correct Answers:*

- $1/2 \cdot x^2 \cdot \arctan(x) - 1/4 \cdot \ln(1+x^2) + C$

**1. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.2.pg**

Evaluate the integral

$$\int -3 \tan^3(x) dx$$

Note: Use an upper-case "C" for the constant of integration.

*Correct Answers:*

- $1/2 * -3 * \tan(x)^2 - 1/2 * -3 * \ln(1 + \tan(x)^2) + C + c$

**2. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.4.pg**

Evaluate the integral

$$\int \frac{9x}{\sqrt{3-x^4}} dx$$

Note: Use an upper-case "C" for the constant of integration.

*Correct Answers:*

- $9/2 * \arcsin(x^2/\sqrt{3}) + C + c$

**3. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.8.pg**

Evaluate the integral

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

*Correct Answers:*

- $1 * -1/3 * \ln(5)$

**4. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.16.pg**

Evaluate the integral

$$\int_0^{\sqrt{2}/2} \frac{1x^2}{\sqrt{1-x^2}} dx$$

*Correct Answers:*

- $1 * (\pi/8 - 1/4)$

**5. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.18.pg**

Evaluate the integral

$$\int \frac{-8e^{2t}}{1+e^{4t}} dt$$

Note: Use an upper-case "C" for the constant of integration.

*Correct Answers:*

- $1/2 * -8 * \arctan(\exp(t)^2) + C + c$

**6. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.24.pg**

Evaluate the integral

$$\int -3 \ln(x^2 - 1) dx$$

Note: Use an upper-case "C" for the constant of integration.

*Correct Answers:*

- $-3 * x * \ln(x^2 - 1) - 2 * -3 * x - 1 * -3 * \ln(\text{abs}(x-1)) + -3 * \ln(\text{abs}(x+1)) + C + c$

**7. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.26.pg**

Evaluate the integral

$$\int \frac{24x^2 - 16}{x^3 - 2x - 8} dx$$

Note: Use an upper-case "C" for the constant of integration.

*Correct Answers:*

- $8 * \ln(\text{abs}(x^3 - 2 * x - 8)) + C + c$

**8. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.32.pg**

Evaluate the integral

$$\int \frac{-6\sqrt{2x-1}}{2x+3} dx$$

Note: Use an upper-case "C" for the constant of integration.

*Correct Answers:*

- $-6 * (\sqrt{2 * x - 1}) - 2 * \arctan(\sqrt{2 * x - 1} / 2) + C + c$

**9. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.36.pg**

Evaluate the integral

$$\int 8 \sin(4x) \cos(3x) dx$$

Note: Use an upper-case "C" for the constant of integration.

*Correct Answers:*

- $8 * (-1/2 * \cos(x) - 1/14 * \cos(7 * x)) + C + c$

**10. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.38.pg**

Evaluate the integral

$$\int_0^{\pi/4} 4 \tan^5(x) \sec^3(x) dx$$

*Correct Answers:*

- $22/105 * 2^{1/2} * 4 - 8/105 * 4$



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**11. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.44.pg**

Evaluate the integral

$$\int 5\sqrt{1+e^x} dx$$

Note: Use an upper-case "C" for the constant of integration.

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*Correct Answers:*

- $2*5*(1+\exp(x))^{1/2}+5*\ln((1+\exp(x))^{1/2}-1)-1*5*\ln((1+\exp(x))^{1/2}+1)+C+c$

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**12. (1 pt) Library/UCSB/Stewart5.7.5/Stewart5.7.5.70.pg**

Evaluate the integral

$$\int \frac{-7\ln(x+1)}{x^2} dx$$

Note: Use an upper-case "C" for the constant of integration.

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*Correct Answers:*