1.(1 pt) Evaluate the integral

$$\int x^5(x^6-9)^{42}dx,$$

by making the substitution $u = x^6 - 9$.

NOTE: Your answer should be in terms of x and not u.

2.(1 pt) **Note:** You can get full credit for this problem by just answering the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the indefinite integral $\int x^7\left(5+9x^8\right)^{10}dx$

Then the most appropriate substitution to simplify this integral is

$u =$ _____

Then $dx = f(x)\,du$ where

$f(x) =$ _____

After making the substitution we obtain the integral $\int g(u)\,du$ where

$g(u) =$ _____

This last integral is: = _____ $+C$

(Leave out constant of integration from your answer.)

After substituting back for u we obtain the following final form of the answer:

= _____ $+C$

(Leave out constant of integration from your answer.)

3.(1 pt) Evaluate the integral by making the given substitution.

$$\int \frac{dx}{(5x+8)^2}$$

$u = 5x+8$

4.(1 pt) Evaluate the integral by making the given substitution.

$$\int \sec(4x)\tan(4x)dx, u = 4x$$

5.(1 pt) Find

$$F(x) = \int x(x^2+4)^2\,dx$$

Give a specific function for $F(x)$.

F(x) = _____

6.(1 pt) Evaluate the indefinite integral.

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

_____ $+C$

7.(1 pt) $\int \sqrt[10]{e^x}\,dx =$ _____ $+C$

8.(1 pt) Evaluate the indefinite integral.

$$\int x^8 e^{x^9}\,dx$$

9.(1 pt) Evaluate the indefinite integral.

$$\int x^4\sqrt{9+x^5}dx$$

10.(1 pt) Evaluate the indefinite integral.

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

11.(1 pt) Evaluate the indefinite integral.

$$\int \frac{\cos x}{7\sin x+35}dx$$

_____ $+C$

12.(1 pt) Evaluate the indefinite integral.

$$\int \frac{x^1}{x^2+6}dx$$

[NOTE: Remeber to enter all necessary *, (, and) !!
Enter arctan(x) for $\tan^{-1}x$, sin(x) for $\sin x$.]

13.(1 pt) Evaluate the indefinite integral.

$$\int \frac{5\,dx}{x\ln(8x)}$$

14.(1 pt) Evaluate the indefinite integral.

$$\int 5e^{5x}\sin(e^{5x})\,dx$$

15.(1 pt) Evaluate the indefinite integral.

$$\int \frac{x+5}{x^2+10x}dx$$

16.(1 pt) Evaluate the indefinite integral.

$$\int \frac{x+4}{x^2+8x+17}dx$$

17.(1 pt) Evaluate the indefinite integral.

$$\int \frac{8x+7}{x^2+1}dx$$

18.(1 pt) Evaluate the indefinite integral.

$$\int \frac{6x}{x^4+1}dx$$

19.(1 pt) Evaluate the indefinite integral.

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

20.(1 pt) Evaluate the indefinite integral.

$$\int \frac{4x-1}{(4x^2-2x+2)^6}dx$$

[NOTE: Remember to enter all necessary *, (, and) !!

21.(1 pt) Evaluate the indefinite integral.

$$\int 4\sin^6 x\cos x dx$$

22.(1 pt) **Note:** You can get full credit for this problem by just entering the answer to the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the indefinite integral $\int \cos^9(5t)\sin(5t)\,dt$

Then the most appropriate substitution to simplify this integral is

$u =$ _____ Then $dt = f(t)\,du$ where

$f(t) =$ _____

After making the substitution we obtain the integral $\int g(u)\,du$ where

$g(u) =$ _____

This last integral is: = _____ $+C$

(Leave out constant of integration from your answer.)

After substituting back for u we obtain the following final form of the answer:

= _____ $+C$

(Leave out constant of integration from your answer.)

23.(1 pt) **Note:** You can get full credit for this problem by just answering the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the definite integral $\int_{\pi/6}^{\pi/2} \frac{\cos(z)}{\sin^9(z)}\,dz$

Then the most appropriate substitution to simplify this integral is

$u =$ _____

Then $dz = f(z)\,du$ where

$f(z) =$ _____

After making the substitution and simplifying we obtain the integral $\int_a^b g(u)\,du$ where

$g(u) =$ _____

$a =$ _____

$b =$ _____

This definite integral has value = _____

24.(1 pt) Evaluate the indefinite integral.

$$\int \sin^3(6x)\cos^2(6x)dx$$

_____ $+C$

25.(1 pt) Evaluate the definite integral.

$$\int_0^{\pi/4} e^{\sin(x)}\cos(x)dx$$

26.(1 pt) Evaluate the definite integral.

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

27.(1 pt) Evaluate the definite integral.

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

28.(1 pt) Evaluate the definite integral.

$$\int_0^3 \frac{dx}{3x+7}$$

29.(1 pt) Evaluate the definite integral.

$$\int_1^{e^6} \frac{dx}{x\sqrt{\ln x}}$$

[NOTE: Remeber to enter all necessary *, (, and) !!
Enter arctan(x) for $\tan^{-1}x$, sin(x) for $\sin x$.]

30.(1 pt) Evaluate the definite integral.

$$\int_1^{e^8} \frac{dx}{x(1+\ln x)}$$

31.(1 pt) Verify that

$$\frac{1}{x^2-1} = \frac{1}{2}\left(\frac{1}{x-1} - \frac{1}{x+1}\right)$$

and use this equation to evaluate

$$\int_2^5 \frac{7}{x^2-1}\,dx$$

32.(1 pt) Evaluate the indefinite integral.

$$\int \frac{e^{6x}}{e^{12x}+25}dx$$

33.(1 pt) $\int_0^1 5^{2x}\,dx =$ _____

34.(1 pt) Use the substitution $x = 6\tan(\theta)$ to evaluate the indefinite integral

$$\int \frac{49\,dx}{x^2\sqrt{x^2+36}}$$

35.(1 pt) **Note:** You can get full credit for this problem by just entering the final answer (to the last question) correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the indefinite integral $\int \frac{1}{\sqrt{1+(3x-7)^2}}\,dx$

Then the most appropriate substitution to simplify this integral is $x = g(t)$ where

$g(t) =$ _____

Note: We are using t as variable for angles instead of θ, since there is no standard way to type θ on a computer keyboard.

After making this substitution and simplifying (using trig identities), we obtain the integral $\int f(t)\,dt$ where

$f(t) =$ _____

This integrates to the following function of t

$\int f(t)\,dt =$ _____ $+C$

After substituting back for t in terms of $x$we obtain the following final form of the answer:

_____ $+C$

36.(1 pt) **Note:** You can get full credit for this problem by just entering the final answer (to the last question) correctly. The

initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the definite integral $\int_{1/\sqrt{7}}^{\sqrt{2/7}} \frac{x^3}{\sqrt{7x^2-1}}\,dx$

Then the most appropriate substitution to simplify this integral is $x = g(t)$ where

$g(t) =$ _____

Note: We are using t as variable for angles instead of θ, since there is no standard way to type θ on a computer keyboard.

After making this substitution and simplifying (using trig identities), we obtain the integral $\int_a^b f(t)\,dt$ where

$f(t) =$ _____

$a =$ _____

$b =$ _____

After evaluating this integral we obtain:

$\int_{1/\sqrt{7}}^{\sqrt{2/7}} \frac{x^3}{\sqrt{7x^2-1}}\,dx =$ _____

37.(1 pt) **Note:** You can get full credit for this problem by just entering the final answer (to the last question) correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the definite integral $\int_7^{14} x\sqrt{14x-x^2}\,dx$

Then the most appropriate substitution to simplify this integral is $x = g(t)$ where

$g(t) =$ _____

Note: We are using t as variable for angles instead of θ, since there is no standard way to type θ on a computer keyboard.

After making this substitution and simplifying (using trig identities), we obtain the integral $\int_a^b f(t)\,dt$ where

$f(t) =$ _____

$a =$ _____

$b =$ _____

After evaluating this integral we obtain:

$\int_7^{14} x\sqrt{14x-x^2}\,dx =$ _____

38.(1 pt) Evaluate the indefinite integral.

$$\int \frac{(\arcsin x)^6}{\sqrt{1-x^2}}\,dx$$

39.(1 pt) **Note:** You can get full credit for this problem by just answering the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the indefinite integral $\int \frac{1}{4x+5\sqrt{x}}\,dx$

Then the most appropriate substitution to simplify this integral is

$u =$ _____

Then $dx = f(x)\,du$ where

$f(x) =$ _____

After making the substitution and simplifying we obtain the integral $\int g(u)\,du$ where

$g(u) =$ _____

This last integral is: = _____ $+C$

(Leave out constant of integration from your answer.)

After substituting back for u we obtain the following final form of the answer:

= _____ $+C$

(Leave out constant of integration from your answer.)

40.(1 pt) **Note:** You can get full credit for this problem by just answering the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit. Also the appropriate way to enter roots (except sqrt) into WeBWorK is to use fractional exponents.

Consider the definite integral $\int_0^1 \frac{dx}{\sqrt{x}+4\sqrt[3]{x}}$

Then the most appropriate substitution to simplify this integral is

$u =$ _____

Then $dx = f(x)\,du$ where

$f(x) =$ _____

After making the substitution and simplifying we obtain the integral $\int_a^b g(u)\,du$ where

$g(u) =$ _____

$a =$ _____

$b =$ _____

This definite integral has value = _____

41.(1 pt) **Note:** You can get full credit for this problem by just answering the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the definite integral $\int_0^1 x^2\sqrt{8x+7}\,dx$

Then the most appropriate substitution to simplify this integral is

$u =$ _____

Then $dx = f(x)\,du$ where

$f(x) =$ _____

After making the substitution and simplifying we obtain the integral $\int_a^b g(u)\,du$ where

$g(u) =$ _____

$a =$ _____

$b =$ _____

This definite integral has value = _____

42.(1 pt) Find the following indefinite integrals.

$\int \frac{x}{\sqrt{x+7}}\,dx =$ _____ $+C$

Hint: This is similar to Problem 6 of WeBWorK Hwwk #2.

$\int \frac{\cos(t)}{(7\sin(t)+12)^2}\,dt =$ _____ $+C$

43.(1 pt) **Note:** You can get full credit for this problem by just entering the answer to the last question correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

Consider the indefinite integral

$$\int \frac{7}{7+e^x}\,dx$$

The most appropriate substitution to simplify this integral is $u = f(x)$ where

$f(x) =$ _____

We then have

$$dx = g(u)\,du$$

where

$g(u) =$ _____

Hint: you need to back substitute for x in terms of u for this part.

After substituting into the original integral we obtain $\int h(u)\,du$ where

$h(u) =$ _____

To evaluate this integral rewrite the numerator as

$$7 = u - (u-7)$$

simplify, then integrate, thus obtaining

$$\int h(u)\,du = H(u)$$

where

$H(u) =$ _____ $+C$

After substituting back for u we obtain our final answer

$\int \frac{7}{7+e^x}\,dx =$ _____ $+C$

44.(1 pt) Consider the integral

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

Then an appropriate trigonometric substitution to simplify this integral is $x = f(t)$ where

$f(t) =$ _____

After making this substitution and simplifying, we obtain the integral $\int g(t)\,dt$ where

$g(t) =$ _____

Note that this problem doesn't ask you to evaluate this integral.

45.(1 pt) For each of the following integrals find an appropriate trigonometric substitution of the form $x = f(t)$ to simplify the integral.

$$\int (4x^2-8)^{3/2}\,dx$$

$x =$ _____

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

$x =$ _____

$$\int x\sqrt{4x^2+40x+96}\,dx$$

$x =$ _____

$$\int \frac{x}{\sqrt{-6-3x^2+12x}}\,dx$$

$x =$ _____

Prepared by the WeBWorK group, Dept. of Mathematics, University of Rochester, ©UR