Student: Cole Lamers **Date:** 10/05/19	**Instructor:** Viktoriya Shcherban **Course:** Calc 1 11:30 AM / Internet (81749&81750) Shcherban	**Assignment:** 5.5 Indefinite Integrals and the Substitution Meth

1. Evaluate the following indefinite integral by using the given substitution to reduce the integral to standard form.

$$\int 3(3x+6)^7\,dx,\ u = 3x+6$$

$$\int 3(3x+6)^7\,dx = \frac{1}{8}(3x+6)^8 + c$$

(Use C as the arbitrary constant.)

2. Evaluate the indefinite integral by using the substitution $u = x^2 + 16$ to reduce the integral to standard form.

$$\int 2x\left(x^2+16\right)^{-11}dx$$

$$\int 2x\left(x^2+16\right)^{-11}dx = -\frac{1}{10\left(x^2+16\right)^{10}} + c$$

(Use C as the arbitrary constant.)

3. Find the indefinite integral.

$$\int \frac{x^8}{\left(3-x^9\right)^2}dx$$

$$\int \frac{x^8}{\left(3-x^9\right)^2}dx = \frac{1}{9\left(3-x^9\right)} + c$$

(Use C as the arbitrary constant.)

4. Evaluate the indefinite integral by using the substitution $u = x^4 + x^2$ to reduce the integral to standard form.

$$\int \left(x^4+x^2\right)^9\left(4x^3+2x\right)dx$$

$$\int \left(x^4+x^2\right)^9\left(4x^3+2x\right)dx = \frac{\left(x^4+x^2\right)^{10}}{10} + c$$

(Use C as the arbitrary constant.)

5. Evaluate the indefinite integral by using the given substitution to reduce the integral to standard form.

$$\int \mathbf{cos}\,(3x)dx,\quad u = 3x$$

$$\int \mathbf{cos}\,(3x)dx = \frac{\mathbf{sin}\,(3x)}{3} + c$$

(Use C as the arbitrary constant.)

6. Use the indicated substitution to evaluate the integral.

$$\int 4\csc(2x)\cot(2x)dx, \quad u = 2x$$

$$\int 4\csc(2x)\cot(2x)dx = -\frac{2}{\sin(2x)} + c$$

(Use C as an arbitrary constant.)

7. Evaluate the indefinite integral by using the given substitution to reduce the integral to standard form.

$$\int \frac{21r^6\,dr}{\sqrt{6 - r^7}}, \; u = 6 - r^7$$

$$\int \frac{21r^6\,dr}{\sqrt{6 - r^7}} = -6\left(6 - r^7\right)^{\frac{1}{2}} + c$$

(Use C as the arbitrary constant.)

8. Evaluate the indefinite integral by using the substitution $u = y^4 + 4y^2 + 4$ to reduce the integral to standard form.

$$\int 12\left(y^4 + 4y^2 + 4\right)^2\left(y^3 + 2y\right)dy$$

$$\int 12\left(y^4 + 4y^2 + 4\right)^2\left(y^3 + 2y\right)dy = \left(y^4 + 4y^2 + 4\right)^3 + c$$

(Use C as the arbitrary constant.)

9. Evaluate the indefinite integral by using the given substitution to reduce the integral to standard form.

$$\int 12\csc^2(6x)\cot(6x)dx, \quad \text{a. } u = \cot(6x), \quad \text{b. } u = \csc(6x)$$

Using $u = \cot(6x)$, $\int 12\csc^2(6x)\cot(6x)dx = -\cot^2(6x) + c$

(Use C as the arbitrary constant.)

Using $u = \csc(6x)$, $\int 12\csc^2(6x)\cot(6x)dx = -\csc^2(6x) + c$

(Use C as the arbitrary constant.)

10. Evaluate the integral $\int \sqrt{8 + 7s}\,ds$.

$$\int \sqrt{8 + 7s}\,ds = \frac{2(7s + 8)^{\frac{3}{2}}}{21} + c$$

(Use C as the arbitrary constant.)

11. Evaluate the integral $\int x \sqrt[9]{1+x^2}\,dx$.

$\int x \sqrt[9]{1+x^2}\,dx = \frac{9}{20}\left(1+x^2\right)^{\frac{10}{9}} + c$

(Use C as an arbitrary constant.)

12. Evaluate the integral.

$$\int \frac{6}{\sqrt{x}\left(1+6\sqrt{x}\right)^5}\,dx$$

$\int \frac{6}{\sqrt{x}\left(1+6\sqrt{x}\right)^5}\,dx = \frac{-1}{2\left(1+6\sqrt{x}\right)^4} + c$

(Use C as the arbitrary constant.)

13. Evaluate the integral.

$$\int -\csc(4x+1)\cot(4x+1)\,dx$$

$\int -\csc(4x+1)\cot(4x+1)\,dx = \frac{1}{4}\csc(4x+1) + c$

(Use C as the arbitrary constant.)

14. Evaluate the integral $\int \sin^5\frac{x}{2}\cos\frac{x}{2}\,dx$.

$\int \sin^5\frac{x}{2}\cos\frac{x}{2}\,dx = \frac{\sin^6\left(\frac{x}{2}\right)}{3} + c$

(Use C as the arbitrary constant.)

15. Evaluate the integral.

$$\int \frac{\sin(6t+3)}{\cos^2(6t+3)}\,dt$$

$\int \frac{\sin(6t+3)}{\cos^2(6t+3)}\,dt = \frac{1}{6\cos(6t+3)} + c$

(Use C as the arbitrary constant.)

16. Evaluate the integral $\int \frac{2}{t^3}\sin\left(\frac{1}{t^2}-9\right)dt$.

$\int \frac{2}{t^3}\sin\left(\frac{1}{t^2}-9\right)dt = \cos\left(\frac{1}{t^2}-9\right) + c$

(Use C as the arbitrary constant.)

17. Evaluate the integral.

$$\int (x+1)^2(1-x)^8\,dx$$

$$\int (x+1)^2(1-x)^8\,dx = -\frac{1}{11}(1-x)^{11} + \frac{2}{5}(1-x)^{10} - \frac{4}{9}(1-x)^9 + c$$

(Use C as the arbitrary constant.)

18. Solve the initial value problem.

$$\frac{ds}{dt} = 36t(9t^2-7)^3, \quad s(1) = 9$$

The solution is $s = \frac{1}{2}\left(9t^2-7\right)^4 + 1$.

19. Solve the initial value problem.

$$\frac{ds}{dt} = 8\,\mathbf{sin}^2\left(t - \frac{\pi}{12}\right),\ s(0) = 7$$

$s = 4t - 2\,\mathbf{sin}\left(2t - \frac{\pi}{6}\right) + 6$

(Type an exact answer, using π as needed.)