Student: Cole Lamers **Date:** 09/26/19	**Instructor:** Viktoriya Shcherban **Course:** Calc 1 11:30 AM / Internet (81749&81750) Shcherban	**Assignment:** 4.7 Antiderivatives (Set 1)

1. Find the antiderivative for each function when C equals 0. Do as many as you can mentally. Check your answers by differentiation.

a. $2x$ **b.** x^5 **c.** $x^2 - 2x - 8$

a. The antiderivative of $2x$ is x^2.

b. The antiderivative of x^5 is $\frac{1}{6}x^6$.

c. The antiderivative of $x^2 - 2x - 8$ is $\frac{1}{3}x^3 - x^2 - 8x$.

2. Find the antiderivative for each function when C equals 0. Check your answers by differentiation.

(a) $g(x) = -6x^{-7}$ **(b)** $h(x) = x^{-7}$ **(c)** $k(x) = x^{-7} + 2x + 5$

(a) $G(x) = x^{-6}$

(b) $H(x) = -\frac{1}{6}x^{-6}$

(c) $K(x) = -\frac{1}{6}x^{-6} + x^2 + 5x$

3. Find the antiderivative for each function when C equals 0. Check your answers by differentiation.

(a) $g(x) = \frac{1}{x^2}$ **(b)** $h(x) = \frac{9}{x^2}$ **(c)** $k(x) = 7 - \frac{9}{x^2}$

(a) $G(x) = -\frac{1}{x}$

(b) $H(x) = -\frac{9}{x}$

(c) $K(x) = 7x + \frac{9}{x}$

4. Find the antiderivative of the function $f(x) = -10$ **sin** $(10x)$ when $C = 0$.

The antiderivative is **cos** $10x$.

5. Find the antiderivative for each function when C equals 0. Do as many as you can mentally. Check your answers by differentiation.

a. $10\cos 10x$ **b.** $\frac{9\pi}{2}\cos\frac{9\pi x}{2}$ **c.** $\cos\frac{5\pi x}{2}+8\pi\cos x$

a. The antiderivative of $10\cos 10x$ is $\sin(10x)$.

b. The antiderivative of $\frac{9\pi}{2}\cos\frac{9\pi x}{2}$ is $\sin\left(\frac{9\pi x}{2}\right)$.

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

c. The antiderivative of $\cos\frac{5\pi x}{2}+8\pi\cos x$ is $\frac{2}{5\pi}\sin\left(\frac{5\pi x}{2}\right)+8\pi\sin(x)$.

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

6. Find the antiderivative for each function when C equals 0. Check your answers by differentiation.

(a) $h(x)=\sec^2 x$ **(b)** $g(x)=\frac{4}{9}\sec^2\frac{x}{9}$ **(c)** $k(x)=-\sec^2\frac{9x}{4}$

(a) $H(x)=\tan x$

(b) $G(x)=4\tan\left(\frac{x}{9}\right)$

(c) $K(x)=-\frac{4}{9}\tan\left(\frac{9x}{4}\right)$

7. Find the indefinite integral $\int(6x+4)dx$.

$\int(6x+4)dx=3x^2+4x+c$

(Use C as an arbitrary constant.)

8. Find the most general antiderivative or indefinite integral. Check your answer by differentiation.

$$\int\left(8t^7+\frac{t}{9}\right)dt$$

$\int\left(8t^7+\frac{t}{9}\right)dt=t^8+\frac{t^2}{18}+c$

(Use C as the arbitrary constant.)

9. Find the most general antiderivative or indefinite integral. Check your answer by differentiation.

$$\int\left(2x^3-7x+2\right)dx$$

$\int\left(2x^3-7x+2\right)dx=\frac{x^4}{2}-\frac{7x^2}{2}+2x+c$ (Use C as the arbitrary constant.)

10. Find the indefinite integral $\int\left(\frac{1}{x^7}-x^7-\frac{1}{7}\right)dx$.

$\int\left(\frac{1}{x^7}-x^7-\frac{1}{7}\right)dx = -\frac{1}{6x^6}-\frac{x^8}{8}-\frac{1}{7}x+c$

(Use C as an arbitrary constant.)

11. Find the most general antiderivative or indefinite integral. Check your answer by differentiation.

$\int x^{-1/3}dx$

$\int x^{-1/3}dx = \frac{3}{2}x^{\frac{2}{3}}+c$ (Use C as the arbitrary constant.)

12. Find the most general antiderivative or indefinite integral. Check your answers by differentiation.

$\int\left(10y^4-\frac{5}{y^{1/3}}\right)dy$

$\int\left(10y^4-\frac{5}{y^{1/3}}\right)dy = 2y^5-\frac{15}{2}y^{\frac{2}{3}}+c$ (Use C as the arbitrary constant.)

13. Find the indefinite integral $\int 8\,\mathbf{cos}\ t\,dt$.

$\int 8\,\mathbf{cos}\ t\,dt = 8\,\mathbf{sin}\ t+c$

(Use C as an arbitrary constant.)

14. Find the most general antiderivative or indefinite integral. Check your answer by differentiation.

$\int 8\,\mathbf{cos}\,\frac{\theta}{5}\,d\theta$

$\int 8\,\mathbf{cos}\,\frac{\theta}{5}\,d\theta = 40\,\mathbf{sin}\left(\frac{\theta}{5}\right)+c$

(Use C as the arbitrary constant.)

15. Find the most general antiderivative or indefinite integral. Check your answer by differentiation.

$\int 10\,\mathbf{csc}^2 x\,dx$

$\int 10\,\mathbf{csc}^2 x\,dx = -10\,\mathbf{cot}\ x+c$

(Use C as the arbitrary constant.)

16. Find the indefinite integral $\int -\frac{\mathbf{csc}\ \theta\ \mathbf{cot}\ \theta}{6}d\theta$.

$\int -\frac{\mathbf{csc}\ \theta\ \mathbf{cot}\ \theta}{6}d\theta = \frac{1}{6}\,\mathbf{csc}\ \theta+c$

(Use C as an arbitrary constant.)

17. Find the most general antiderivative or indefinite integral. Check your answers by differentiation.

$$\int \left(\sin 5x - \sec^2 x \right) dx$$

$\int \left(\sin 5x - \sec^2 x \right) dx = -\frac{1}{5}\cos 5x - \tan x + c$ (Use C as the arbitrary constant.)

18. Find the most general antiderivative or indefinite integral. Check your answer by differentiation.

$$\int \frac{5 + \sin(5t)}{7}\, dt$$

$\int \frac{5 + \sin(5t)}{7}\, dt = -\frac{1}{35}\cos 5t + \frac{5}{7}t + c$

(Use C as the arbitrary constant.)

19. Find the function y(x) satisfying $\frac{dy}{dx} = 6x - 7$ and $y(3) = 0$.

The function y(x) satisfying $\frac{dy}{dx} = 6x - 7$ and $y(3) = 0$ is $y(x) = 3x^2 - 7x - 6$.

20. Find the function s(t) satisfying $\frac{ds}{dt} = 4 - 3\cos t$ and $s(0) = 2$.

The function satisfying $\frac{ds}{dt} = 4 - 3\cos t$ and $s(0) = 2$ is $s(t) = 4t - 3\sin t + 2$.

21. Solve the following initial value problem.

$$\frac{dr}{d\theta} = -\pi\cos \pi\theta,\ r(0) = 2$$

$r = -\sin \pi\theta + 2$ (Type an exact answer, using π as needed.)

22. Find the function y(x) satisfying $\frac{d^2y}{dx^2} = 8 - 18x$, $y'(0) = 4$, and $y(0) = 3$.

The function satisfying $\frac{d^2y}{dx^2} = 8 - 18x$, $y'(0) = 4$, and $y(0) = 3$ is $y(x) = -3x^3 + 4x^2 + 4x + 3$.

23. Find the function y(x) satisfying $\frac{d^3y}{dx^3} = 12$, $y''(0) = 12$, $y'(0) = 6$, and $y(0) = 4$.

The function y(x) satisfying $\frac{d^3y}{dx^3} = 12$, $y''(0) = 12$, $y'(0) = 6$, and $y(0) = 4$ is $2x^3 + 6x^2 + 6x + 4$.