

Antiderivatives and Indefinite
Integrals

1. Verify the statement by showing that the derivative of the right side is equal to the integrand on the left side
(Similar to p.319 #1-6)

$$\int 6x^2 dx = 2x^3 + C$$

2. Verify the statement by showing that the derivative of the right side is equal to the integrand on the left side
(Similar to p.319 #1-6)

$$\int \left(3 - \frac{1}{\sqrt[5]{x^4}} \right) dx = 3x - 5\sqrt{x} + C$$

3. Find the indefinite integral.
(Similar to p.319 #7-18)

$$\int 3 dx$$

4. Find the indefinite integral.
(Similar to p.319 #7-18)

$$\int 7x^2 dx$$

5. Find the indefinite integral.
(Similar to p.319 #7-18)

$$\int 2y^{-3} dx$$

6. Find the indefinite integral.
(Similar to p.319 #7-18)

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

7. Find the indefinite integral.
(Similar to p.319 #19-23)

$$\int \frac{1}{x^5} dx$$

8. Find the indefinite integral.
(Similar to p.319 #19-23)

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

9. Find the indefinite integral.
(Similar to p.319 #19-23)

$$\int \frac{1}{(5x)^3} dx$$

10. Find the indefinite integral.
(Similar to p.319 #25-36)

$$\int (5x^3 - 7x^2 + 2x - 1) dx$$

11. Find the indefinite integral.
(Similar to p.319 #25-36)

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

12. Find the indefinite integral.
(Similar to p.319 #25-36)

$$\int \left(\frac{3x-5}{\sqrt{x}} \right) dx$$

13. Find the particular solution that satisfies the differential equation and the initial condition
(Similar to p.320 #41-48)

$$f'(x) = 8x^3 + 3; \quad f(1) = 8$$

14. Find a function f that satisfies the initial conditions
(Similar to p.320 #49-52)

$$f''(x) = x^3 - 1; \quad f'(1) = 3; \quad f(3) = -2$$

15. Find the cost function for the given marginal cost and fixed cost
(Similar to p.320 #53-56)

Maginal Cost	Fixed Cost ($x = 0$)
$\frac{dC}{dx} = \frac{\sqrt[3]{x}}{5}$	\$1000

16. Find the revenue and demand functions for the given marginal revenue
(Use the fact that $R = 0$ when $x = 0$)
(Similar to p.320 #57-58)

$$\frac{dR}{dx} = 400 - 2x$$

17. Find the profit function for the given marginal profit and initial condition
(Similar to p.320 #59-62)

Maginal Profit	Initial Condition
$\frac{dP}{dx} = -12x + 300$	$P(10) = \$5,000$