

# More Integration

## Problem Set 21

1. Find each of the following definite integrals.

$$(a) \int_0^2 (4 - x^2) \, dx$$

$$(c) \int_{-1}^7 \left( 3x - \frac{1}{x^2} \right) \, dx$$

$$(b) \int_1^{25} \frac{1}{\sqrt{x}} \, dx$$

$$(d) \int_1^2 (x - x^2) \, dx$$

2. If  $\int_{-1}^4 f(x) \, dx = 3$  and  $\int_3^4 f(x) \, dx = 7$ , find  $\int_{-1}^3 f(x) \, dx$ .

3. Find each of the following integrals.

$$(a) \int (2x + 3)^4 \, dx$$

$$(f) \int \frac{1}{(3x + 1)^4} \, dx$$

$$(b) \int (4x - 1)^{10} \, dx$$

$$(g) \int (4x - 7)^{\frac{1}{3}} \, dx$$

$$(c) \int (7 - 3x)^8 \, dx$$

$$(h) \int \sqrt{8x - 5} \, dx$$

$$(d) \int (2 - x)^5 \, dx$$

$$(i) \int \frac{1}{\sqrt{2x + 1}} \, dx$$

$$(e) \int (2x + 3)^{-5} \, dx$$

$$(j) \int \frac{1}{\sqrt{3 - 7x}} \, dx$$

4. Find the following integrals.

$$(a) \int (3x + 4)^7 \, dx$$

$$(d) \int (4x + 1)^{-3} \, dx$$

$$(b) \int (2x - 5)^{11} \, dx$$

$$(e) \int \frac{1}{(x + 5)^4} \, dx$$

$$(c) \int (2 - 3x)^4 \, dx$$

$$(f) \int \sqrt{5x + 3} \, dx$$

5. Evaluate the following integrals.

$$(a) \int_1^5 (4x + 2)^2 \, dx$$

$$(c) \int_{-1}^2 (2x - 3)^{-2} \, dx$$

$$(b) \int_0^2 \frac{3}{(2x - 1)^5} \, dx$$

$$(d) \int_3^4 \sqrt{x + 5} \, dx$$

6. Find the following integrals

$$(a) \int (e^x + \sin x) \, dx$$

$$(b) \int \left(3 - \frac{1}{x}\right) \, dx$$

$$(c) \int \left(3e^x + \frac{4}{x} + \frac{1}{x^2}\right) \, dx$$

$$(d) \int (\sec^2 x + 2 \sin x) \, dx$$

$$(e) \int \left(5 \cos t + 2e^t - \frac{1}{t}\right) \, dt$$

$$(f) \int_1^3 \frac{\sqrt{x} - 1}{x} \, dx$$

$$(g) \int_0^{\frac{\pi}{2}} (\cos x - \sin x) \, dx$$

7. Evaluate the following integrals.

$$(a) \int \sin 6x \, dx$$

$$(b) \int \cos 10x \, dx$$

$$(c) \int e^{2x} \, dx$$

$$(d) \int e^{3x} \, dx$$

$$(e) \int e^{-4x} \, dx$$

$$(f) \int 3 \sin 4x \, dx$$

$$(g) \int \sec^2 3x \, dx$$

$$(h) \int \cos\left(\frac{x}{2}\right) \, dx$$

$$(i) \int (e^{5x} - \sin 7x) \, dx$$

$$(j) \int (2 \sin 3x + \cos 4x) \, dx$$

8. Evaluate the following integrals.

$$(a) \int \sin(3x + 4) \, dx$$

$$(b) \int e^{4x-1} \, dx$$

$$(c) \int 3 \cos(x - 1) \, dx$$

$$(d) \int \sec^2(5x + 12) \, dx$$

$$(e) \int \frac{1}{2x + 5} \, dx$$

$$(f) \int \frac{1}{(2x + 5)^2} \, dx$$

$$(g) \int \frac{4}{3x + 2} \, dx$$

$$(h) \int \frac{3}{3x + 2} \, dx$$

$$(i) \int \cos(3 - 7x) \, dx$$

$$(j) \int (e^{7x} - \sin(1 - 2x)) \, dx$$

9. Evaluate the definite integral  $\int_0^2 \frac{2}{1 - 3x} \, dx$ .

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$$\text{Ans: 4a) } \frac{(3x + 4)^8}{24} + C, \quad \text{b) } \frac{(2x - 5)^{12}}{24} + C, \quad \text{c) } \frac{(2 - 3x)^5}{-15} + C, \quad \text{d) } \frac{(4x - 1)^{-2}}{-8} + C, \quad \text{e) } \frac{(x + 5)^{-3}}{-3} + C,$$
$$\text{f) } \frac{2}{15}(5x + 3)^{\frac{3}{2}} + C$$