

Workbook



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The Indefinite Integral

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Questions

Compute the following integrals:

1) a. $\int 4dx$

b. $\int \frac{4e}{\sqrt{5}} dx$

c. $\int dx$

2) a. $\int x^{-3} dx$

b. $\int \frac{1}{x^4} dx$

c. $\int \frac{1}{x^{10}} dx$

3) a. $\int x^{\frac{1}{4}} dx$

b. $\int \sqrt{x} dx$

c. $\int \sqrt[4]{x^3} dx$

4) a. $\int \frac{1}{x\sqrt{x}} dx$

b. $\int \frac{1}{\sqrt[3]{x^2}} dx$

c. $\int \frac{x^2}{\sqrt{x}} dx$

5) a. $\int (2x^2 - x + 1) dx$

b. $\int \left(\frac{3}{x^4} + 2\sqrt[3]{x} \right) dx$

c. $\int (x^2 + 1)^2 dx$

6) a. $\int (x^2 + 1)(x + 2) dx$

b. $\int \frac{1 + 2x^2 + x^4}{x^2} dx$

c. $\int \frac{x+1}{\sqrt{x}} dx$

7) a. $\int (4x+1)^{10} dx$

b. $\int (x^2 - 2x + 1)^{10} dx$

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

8) a. $\int \sqrt[3]{4x-10} dx$

b. $\int \frac{10}{\sqrt{2x+4}} dx$

c. $\int \frac{x}{(x-1)^4} dx$

9) a. $\int \frac{dx}{\sqrt{x-1} - \sqrt{x}}$

b. $\int \frac{xdx}{\sqrt{x+1} + 1}$

c. $\int \frac{x-1}{\sqrt{x-1}} dx$

10) a. $\int \frac{4}{x} dx$

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

c. $\int \left(1 + \frac{1}{x} \right)^2 dx$

11) a. $\int \frac{1}{2x-10} dx$

b. $\int \frac{2x+2}{2x+1} dx$

c. $\int \frac{4x+1}{16x^2-1} dx$

12) a. $\int \frac{4x+1}{x+2} dx$

b. $\int \frac{4x+1}{3x+2} dx$

c. $\int \frac{x-1}{2x^2+x-3} dx$

13) a. $\int (e^{4x+1}) dx$

b. $\int \frac{e^x + e^{2x} + e^{3x}}{e^{4x}} dx$

c. $\int \left(4\sqrt{e^x} + \frac{1}{\sqrt[3]{e^{4x}}} \right) dx$

14) a. $\int (e^{x+1})^2 dx$

b. $\int \left(4\sqrt{e^x} + \frac{1}{\sqrt[3]{e^{4x}}} \right) dx$

c. $\int \frac{2^x + 4^{2x} + 10^{3x}}{5^x} dx$

15) a. $\int \frac{1}{1+4x^2} dx$

b. $\int \frac{1}{\sqrt{4-x^2}} dx$

c. $\int \frac{x^2}{1-x^2} dx$

16) a. $\int \cos(4x) dx$

b. $\int \sin\left(\frac{x}{2}\right) dx$

c. $\int (2\sin(4x) + \cos(x)) dx$

Answer Key

1) a. $4x + C$

b. $\frac{4e}{\sqrt{5}}x + C$

c. $x + C$

2) a. $-\frac{1}{2x^2} + C$

b. $-\frac{1}{3x^3} + C$

c. $-\frac{1}{9x^9} + C$

3) a. $\frac{4}{5}x^{\frac{5}{4}} + C$

b. $\frac{2}{3}x\sqrt{x} + C$

c. $\frac{4}{7}\sqrt[4]{x^7} + C$

4) a. $-\frac{2}{\sqrt{x}} + C$

b. $3\sqrt[3]{x} + C$

c. $\frac{2}{5}x^2\sqrt{x} + C$

5) a. $\frac{2}{3}x^3 - \frac{x^2}{2} + x + C$

b. $-\frac{1}{x^3} + \frac{3}{4}x^3\sqrt{x} + C$

c. $\frac{x^5}{5} + 2\frac{x^3}{3} + x + C$

6) a. $\frac{x^4}{4} + 2\frac{x^3}{3} + \frac{x^2}{2} + 2x + C$

b. $-\frac{1}{x} + 2x + \frac{x^3}{3} + C$

c. $\frac{2}{3}x\sqrt{x} + 2\sqrt{x} + C$

7) a. $\frac{1}{4} \frac{(4x+1)^{11}}{11} + C$

b. $\frac{(x-1)^{21}}{21} + C$

c. $-\frac{1}{(x-2)^4} + C$

8) a. $\frac{3}{16}(4x-10)\sqrt[3]{4x-10} + C$

b. $10\sqrt{2x+4} + C$

c. $-\frac{1}{2} \cdot \frac{1}{(x-1)^2} - \frac{1}{3} \cdot \frac{1}{(x-1)^3} + C$

9) a. $-\left[\frac{(x-1)^{1.5}}{1.5} + \frac{x^{1.5}}{1.5} \right] + C$

b. $\frac{2(x-1)^{1.5}}{3} - x + C$

c. $\frac{2}{3}\sqrt{x^3} + x + C$

10) a. $4\ln|x| + C$

b. $-\frac{1}{x} + \ln|x| + C$

c. $x + 2\ln|x| - \frac{1}{x} + C$

11) a. $\frac{1}{2}\ln|2x-10| + C$

b. $x + \frac{1}{2}\ln|2x+1| + C$

c. $\frac{1}{4}\ln|4x-1| + C$

12) a. $4x - 7\ln|x+2| + C$

b. $\frac{4}{3}x - \frac{5}{9}\ln\left|x + \frac{2}{3}\right| + C$

c. $\frac{1}{2}\ln|2x-3| + C$

13) a. $\frac{1}{4}e^{4x+1} + C$

b. $-\frac{1}{3e^{3x}} - \frac{1}{2e^{2x}} - \frac{1}{e^x} + C$

c. $8e^{\frac{1}{2}x} - \frac{3}{4}e^{-\frac{4}{3}x} + C$

14) a. $\frac{1}{2}e^{2x+2} + C$

b. $8e^{\frac{1}{2}x} - \frac{3}{4}e^{-\frac{4}{3}x} + C$

c. $\frac{0.4^x}{\ln 0.4} + \frac{3.2^x}{\ln 3.2} + \frac{200^x}{\ln 200} + C$

15) a. $\frac{1}{2}\arctan(2x) + C$

b. $\arcsin\left(\frac{x}{2}\right) + C$

c. $\frac{1}{2}\ln\left|\frac{1+x}{1-x}\right| - x + C$

16) a. $\frac{1}{4}\sin(4x) + C$

b. $-2\sin\left(\frac{x}{2}\right) + C$

c. $-\frac{1}{2}\cos(4x) + \sin(x) + C$