

第五章 不定积分

- 1.(1) D; (2) D; (3) B; (4) A; (5) B; (6) B;
 (7) C; (8) A; (9) A; (10) D; (11) A; (12) B;
 (13) A; (14) B.

$$2.(1) \frac{1}{x \ln 2} - \frac{1}{1+x^2};$$

$$(2) \frac{2x}{(x^2+1)^2};$$

$$(3) \ln|x| - \frac{2}{x} + C;$$

$$(4) \frac{3}{2}x^{\frac{2}{3}} + C;$$

$$(5) \frac{1}{2}\sin 2x + \frac{1}{2}\cos 2x + C;$$

$$(6) \frac{1}{2}e^{2x} - \ln|x| + C;$$

$$(7) \frac{1}{3}x^3 - \frac{2^x}{\ln 2} - 2\ln|x| + C;$$

$$(8) \frac{3}{2}y^{\frac{2}{3}} + \frac{6}{5}y^{\frac{5}{3}} + \frac{3}{8}y^{\frac{8}{3}} + C;$$

$$(9) \ln|x| - \frac{2}{x} + C;$$

$$(10) -\frac{1}{4}\cos^4 x + C;$$

$$(11) \arctan x + C;$$

$$(12) \tan x - \frac{1}{\cos x} + C;$$

$$(13) \ln|x| + C;$$

$$(14) \frac{1}{2}(1+x^3)^2 + C;$$

$$(15) \frac{1}{3}(1+2\arctan x)^{\frac{3}{2}} + C;$$

$$(16) \arcsin x + C;$$

$$(17) \frac{(4+3x)^{\frac{3}{2}}}{27} - \frac{(3x-2)^{\frac{3}{2}}}{27} + C;$$

$$(18) \frac{1}{x}\cos\frac{1}{x} - \sin\frac{1}{x} + C;$$

$$(19) \frac{1}{4}\ln\left|\frac{x-2}{x+2}\right| + C;$$

$$(20) \frac{1}{2}\ln|x^2-2x+5| + \arctan\frac{x-1}{2} + C;$$

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

$$3.(1) -\cos x + C;$$

$$(2) \sin x + C;$$

$$(3) \tan x + C;$$

$$(4) \cot x + C;$$

$$(5) \sec x + C;$$

$$(6) \csc x + C;$$

$$(7) \ln|x| + C;$$

$$(8) -\frac{2}{x} + C;$$

$$(9) \frac{8}{15}x^{\frac{15}{8}} + e^x + C;$$

$$(10) \frac{8}{15}x^{\frac{15}{8}} - \ln|x| + C;$$

$$(11) \frac{3^x}{\ln 3} + e^x + \frac{2}{3} x^{\frac{3}{2}} + C ;$$

$$(12) \frac{2^x}{\ln 2} + e^x + \frac{2}{7} x^{\frac{7}{2}} + C ;$$

$$(13) -\frac{4}{x} + x + \frac{1}{48} x^3 + C ;$$

$$(14) -\frac{9}{x} + \frac{3}{2} x + \frac{x^3}{48} + C ;$$

$$(15) \ln |x| + \frac{3}{x} + C ;$$

$$(16) 2x^{\frac{1}{2}} - 4x^{\frac{3}{4}} + C ;$$

$$(17) 3x - e^x + \frac{4}{x} + C ;$$

$$(18) x^3 + \arctan x + C ;$$

$$(19) \frac{4}{11} x^{\frac{11}{4}} + \frac{3}{5} x^{\frac{5}{3}} - \frac{2}{3} x^{\frac{3}{2}} + C ;$$

$$(20) \frac{4}{9} x^{\frac{9}{4}} + \frac{3}{4} x^{\frac{4}{3}} + \ln |x| + C ;$$

$$(23) \arctan x - \frac{1}{x} + C ;$$

$$(24) \arctan x - \frac{1}{2x} + C ;$$

$$(25) -\frac{1}{4} \cos 4x + C ;$$

$$(26) \frac{1}{3} \sin 3x + C ;$$

$$(27) -e^{-x} + C ;$$

$$(28) -\frac{1}{2} e^{-x^2} + C ;$$

$$(29) \frac{1}{6} (2x-1)^3 + C ;$$

$$(30) \frac{1}{3} (x-4)^3 + C ;$$

$$(31) \ln(\ln x) + C ;$$

$$(32) -2e^{\frac{1}{x}} + C ;$$

$$(33) -\frac{3}{4} (3-2x)^{\frac{2}{3}} + C ;$$

$$(34) \frac{1}{3} (\arctan x)^3 + C ;$$

$$(35) \arctan(\ln x) + C ;$$

$$(36) \arcsin(\ln x) + C ;$$

$$(37) \frac{1}{6} \sin^6 x + C ;$$

$$(38) -\frac{2}{5} \cos^5 x + C ;$$

$$(39) -2(1-x^2)^{\frac{1}{2}} + C ;$$

$$(40) \frac{\sqrt{5}}{5} \arctan \sqrt{5} x + C ;$$

$$(41) \frac{1}{6} \ln(7+3x^2) + C ;$$

$$(42) \frac{1}{3} \ln \left| \frac{x-1}{x+2} \right| + C ;$$

$$(43) \frac{1}{2} \tan^2 x + C ;$$

$$(43) -\frac{1}{2} \cot^2 x + C ;$$

$$(45) \arcsin e^x + C ;$$

$$(46) -\frac{1}{2} (4-x^4)^{\frac{1}{2}} + C ;$$

$$(47) \frac{\sin^3 x}{3} - \frac{\sin^5 x}{5} + C$$

$$(48) \frac{1}{6} \sin^6 x + C ;$$

$$(49) \ln(\cos x) + \frac{\sec^2 x}{2} + C ;$$

$$(50) -\ln(\sin x) - \frac{\csc^2 x}{2} + C ;$$

$$4.(1) -2\arctan\sqrt{3-x} + C ;$$

$$(2) -3\sqrt{9-x^2} + 2\arcsin\frac{x}{3} + C ;$$

$$(3) x - 2\sqrt{x} - 2\ln(\sqrt{x} + 1) + C ;$$

$$(4) \frac{6}{7}x^{\frac{7}{6}} - x + \frac{6}{5}x^{\frac{5}{6}} + C ;$$

$$(5) 2\sqrt{e^x - 1} - 2\arctan\sqrt{e^x - 1} + C ;$$

$$(6) 2\sqrt{x} - 3\cdot\sqrt[3]{x} + 6\cdot\sqrt[6]{x} - 6\ln|1 + \sqrt[6]{x}| + C ;$$

$$(7) -3x + \frac{x^3}{9} + C ;$$

$$(8) \arccos\frac{1}{|x|} + C ;$$

$$(9) \frac{\sqrt{x^2 - 1}}{x} + C ;$$

$$(10) x^2 \sin x + 2x \cos x - 2\sin x + C ;$$

$$(11) \frac{x}{\sqrt{1+x^2}} + C ;$$

$$(12) \frac{x}{2}\sqrt{a^2 - x^2} + \frac{a^2}{2}\arcsin\frac{x}{a} + C ;$$

$$(13) \ln(x + \sqrt{x^2 + a^2}) + C ;$$

$$(14) \ln|x + \sqrt{x^2 - a^2}| + C ;$$

$$(15) \frac{1}{24}(\sqrt{2+4x})^3 - \frac{1}{4}\sqrt{2+4x} + C ;$$

$$(16) -\frac{x}{9\sqrt{x^2 - 9}} + C ;$$

$$(17) \ln\left|\frac{1 - \sqrt{1-x^2}}{x}\right| + C ;$$

$$(18) x\arctan\frac{1}{x} + \frac{1}{2}\ln(1+x^2) + C ;$$

$$(19) 2\sqrt{1+\ln x} + \ln\left|\frac{1 - \sqrt{1+\ln x}}{1 + \sqrt{1+\ln x}}\right| + C ;$$

$$(20) \frac{2}{27}(\sqrt{3e^x - 2})^3 + \frac{12}{27}\sqrt{3e^x - 2} + C ;$$

$$(21) -xe^{-x} - e^{-x} + C ;$$

$$(22) (x+1)\ln(x+1) - x + C ;$$

$$(23) -x\cos x + \sin x + C ;$$

$$(24) e^x(x^2 - 2x + 2) + C ;$$

$$(25) \frac{1}{3}xe^{3x} - \frac{1}{9}e^{3x} + C ;$$

$$(26) \frac{1}{2}(1+x^2)\arctan x - \frac{1}{2}x + C ;$$

$$(27) x^2 \sin x + 2x \cos x - 2\sin x + C ;$$

$$(28) x(\ln x)^2 - 2x\ln x + 2x + C ;$$

$$(29) x\tan x + \ln|\cos x| + C ;$$

$$(30) \frac{1}{\ln 2}(x-1)2^x - \frac{1}{(\ln 2)^2}2^x + C ;$$

$$(31) \frac{1}{2}\sec x \tan x + \frac{1}{2}\ln|\sec x + \tan x| + C ;$$

$$(32) \frac{1}{2}(x^4 \sin x^2 + 2x^2 \cos x^2 - 2\sin x^2) + C .$$