# *Розрахункова робота № 1*

**Тема**. *Інтеграли. Застосування інтегралів*.

**Завдання 1**. Обчислити інтеграли.

**1.1.** $\int \frac{3+\sqrt[3]{x^2}-2x}{\sqrt{x}}dx$.

**1.2.** $\int \frac{2x^2+3\sqrt{x}-1}{2x}dx$.

**1.3.** $\int \frac{3\sqrt{x}+4x^2-5}{2x}dx$.

**1.4.** $\int \frac{2\sqrt{x}-x^2+3}{\sqrt[3]{x}}dx$.

**1.5.** $\int \frac{\sqrt[4]{x}-2x+5}{x^2}dx$.

**1.6.** $\int \frac{2x^3-\sqrt{x}+4}{\sqrt{x}}dx$.

**1.7.** $\int (\sqrt[3]{x}-\frac{2\sqrt[4]{x}}{x}+3)dx$.

**1.8.** $\int \frac{2x^3-\sqrt{x^5}+1}{\sqrt{x}}dx$.

**1.9.** $\int \frac{3x^2-\sqrt[5]{x}+2}{x}dx$.

**1.10.** $\int \frac{2x^3-\sqrt{x}+4}{x^2}dx$.

**1.11.** $\int \frac{\sqrt[6]{x^5}-5x^2+3}{x}dx$.

**1.12.** $\int (x\sqrt{x}-\frac{1}{\sqrt{x^3}}+1)dx$.

**1.13.** $\int (x^2-\frac{\sqrt[6]{x}}{x}-3)dx$.

**1.14.** $\int \frac{\sqrt[3]{x^2}-2x^5+3}{x}dx$.

**1.15.** $\int (\frac{\sqrt[3]{x}}{x}+2x^3-4)dx$.

**1.16.** $\int \frac{\sqrt{x^3}-3x^4+2}{x}dx$.

**1.17.** $\int (2x^3-3\sqrt{x^5}+\frac{4}{x})dx$.

**1.18.** $\int \frac{2x^3-\sqrt{x^5}+5}{x^2}dx$.

**1.19.** $\int \frac{3x^2-\sqrt{x^2}+7}{x^2}dx$.

**1.20.** $\int \frac{3x^4-\sqrt[3]{x^2}+1}{x^2}dx$.

**1.21.** $\int (\sqrt[5]{x^2}-\frac{2}{x^3}+4)dx$.

**1.22.** $\int \frac{\sqrt{x}-2x^3+6}{x}dx$.

**1.23.** $\int \frac{\sqrt[5]{x}-2x^3+4}{x^2}dx$.

**1.24.** $\int (\sqrt{x}-\frac{3x^2}{\sqrt{x^3}}+2)dx$.

**1.25.** $\int (\sqrt[5]{x}-\frac{4}{x^5}+2)dx$.

**1.26.** $\int \frac{\sqrt[7]{x^6}-2x^2+3}{x}dx$.

**1.27.** $\int (\frac{\sqrt[3]{x}}{x}-\frac{2}{x^3}+1)dx$.

**1.28.** $\int (\frac{2x^2}{\sqrt{x}}-\frac{5}{x}+6)dx$.

**1.29.** $\int(\frac{\sqrt[3]{x^2}}{x}-\frac{7}{x^3}+5)dx$.

**1.30.** $\int(\frac{5x^2}{\sqrt{x}}-\sqrt[3]{x^2}+2)dx$.

**Завдання 2**. Обчислити інтеграли.

**2.1.** $\int\sqrt{3+x}dx$.

**2.2.** $\int\sqrt[3]{1+x}dx$.

**2.3.** $\int\sqrt[3]{(1+x)^2}dx$.

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

**2.5.** $\int\frac{dx}{\sqrt{(1-x)^3}}$.

**2.6.** $\int\frac{dx}{\sqrt[3]{2+x}}$.

**2.7.** $\int(1-4x)^7dx$.

**2.8.** $\int(1+4x)^5dx$.

**2.9.** $\int(1-3x)^4dx$.

**2.10.** $\int\sqrt{1+3x}dx$.

**2.11.** $\int\sqrt{5-4x}dx$.

**2.12.** $\int\frac{dx}{\sqrt[3]{5+3x}}$.

**2.13.** $\int\frac{dx}{\sqrt[3]{(1-4x)^5}}$.

**2.14.** $\int\frac{dx}{\sqrt[3]{(3-4x)^2}}$.

**2.15.** $\int\frac{dx}{\sqrt[3]{2-5x}}$.

**2.16.** $\int\sqrt[5]{3-2x}dx$.

**2.17.** $\int\sqrt[4]{1+3x}dx$.

**2.18.** $\int\sqrt[3]{1+3x}dx$.

**2.19.** $\int\frac{dx}{\sqrt{(3-x)^5}}$.

**2.20.** $\int\frac{dx}{\sqrt[3]{3+x}}$.

**2.21.** $\int\frac{dx}{(2+x)^3}$.

**2.22.** $\int\sqrt[3]{5-2x}dx$.

**2.23.** $\int\sqrt{5-4x}dx$.

**2.24.** $\int\sqrt[5]{(6-5x)^2}dx$.

**2.25.** $\int\sqrt[4]{2-5x}dx$.

**2.26.** $\int\sqrt[3]{4-2x}dx$.

**2.27.** $\int\sqrt{3-4x}dx$.

**2.28.** $\int\sqrt[5]{3+2x}dx$.

**2.29.** $\int\sqrt[4]{(3+5x)^3}dx$.

**2.30.** $\int\sqrt[3]{(2-x)^2}dx$.

**Завдання 3**. Обчислити інтеграли.

**3.1.** $\int\frac{\sqrt{3}dx}{9x^2-3}$.

**3.2.** $\int\frac{dx}{\sqrt{9x^2+3}}$.

**3.3.** $\int \frac{dx}{9x^2+3}$.

**3.4.** $\int \frac{9dx}{\sqrt{9x^2-3}}$.

**3.5.** $\int \frac{dx}{\sqrt{3-9x^2}}$.

**3.6.** $\int \frac{dx}{7x^2-4}$.

**3.7.** $\int \frac{3dx}{\sqrt{7x^2-4}}$.

**3.8.** $\int \frac{dx}{5x^2+3}$.

**3.9.** $\int \frac{dx}{5x^2-3}$.

**3.10.** $\int \frac{dx}{\sqrt{3-5x^2}}$.

**3.11.** $\int \frac{dx}{\sqrt{5x^2+3}}$.

**3.12.** $\int \frac{dx}{\sqrt{4-7x^2}}$.

**3.13.** $\int \frac{\sqrt{5}dx}{\sqrt{3-4x^2}}$.

**3.14.** $\int \frac{dx}{\sqrt{2x^2-9}}$.

**3.15.** $\int \frac{dx}{2x^2+7}$.

**3.16.** $\int \frac{dx}{\sqrt{3x^2+1}}$.

**3.17.** $\int \frac{xdx}{\sqrt{5-4x^2}}$.

**3.18.** $\int \frac{xdx}{\sqrt{5-3x^2}}$.

**3.19.** $\int \frac{3xdx}{4x^2+1}$.

**3.20.** $\int \frac{4xdx}{\sqrt{3-4x^2}}$.

**3.21.** $\int \frac{dx}{\sqrt{2-5x^2}}$.

**3.22.** $\int \frac{dx}{2x^2-5}$.

**3.23.** $\int \frac{dx}{\sqrt{7x^2-3}}$.

**3.24.** $\int \frac{dx}{5x^2+2}$.

**3.25.** $\int \frac{dx}{2x^2+3}$.

**3.26.** $\int \frac{dx}{\sqrt{5x^2+1}}$.

**3.27.** $\int \frac{dx}{2x^2+9}$.

**3.28.** $\int \frac{dx}{\sqrt{9-2x^2}}$.

**3.29.** $\int \frac{dx}{\sqrt{9x^2+2}}$.

**3.30.** $\int \frac{dx}{5x^2-4}$.

**<u>Завдання 4</u>**. Обчислити інтеграли.

**4.1** $\int \frac{dx}{(2x+1)\sqrt[3]{\ln^2(2x+1)}}$.

**4.2.** $\int \frac{\sqrt[3]{\ln^2(1-x)}}{x-1}dx$.

**4.3.** $\int \frac{dx}{(1-x)\sqrt[3]{\ln^2(1-x)}}$.

**4.4.** $\int \frac{dx}{(1-x)\sqrt{\ln^3(1-x)}}$.

**4.5.** $\int \frac{\ln^3(1-x)}{x-1}dx$.

**4.6.** $\int \frac{\sqrt{\ln(2x-1)}}{2x-1}dx$.

**4.7.** $\int \frac{\sqrt[3]{\ln(3x+1)}}{3x+1}dx$.

**4.8.** $\int \frac{dx}{(x+1)\ln^2(x+1)}$.

**4.9.** $\int \frac{dx}{(x+1)\sqrt[3]{\ln(x+1)}}$.

**4.10.** $\int \frac{dx}{(x+1)\ln^2(x+1)}$.

**4.11.** $\int \frac{\sqrt{\ln^5(x+1)}}{x+1}dx$.

**4.12.** $\int \frac{\sqrt[7]{\ln^2(x+1)}}{x+1}dx$.

**4.13.** $\int \frac{\sqrt{\ln^3(x+1)}}{x+1}dx$.

**4.14.** $\int \frac{dx}{(x+1)\sqrt[5]{\ln(x+1)}}$.

**4.15.** $\int \frac{dx}{(x+1)\sqrt[5]{\ln(x+1)}}$.

**4.16.** $\int \frac{dx}{(x+2)\sqrt{\ln(x+2)}}$.

**4.17.** $\int \frac{\sqrt{\ln^3(x+1)}}{x+1}dx$.

**4.18.** $\int \frac{dx}{(x-3)\ln^4(x-3)}$.

**4.19.** $\int \frac{\sqrt{\ln^5(x+1)}}{x+1}dx$.

**4.20.** $\int \frac{\ln^3(x-5)}{x-5}dx$.

**4.21.** $\int \frac{dx}{(x+1)\sqrt[3]{\ln(x+1)}}$.

**4.22.** $\int \frac{dx}{(x-3)\ln^4(x-3)}$.

**4.23.** $\int \frac{\sqrt{\ln^3(x+3)}}{x+3}dx$.

**4.24.** $\int \frac{\sqrt[3]{\ln^4(x-5)}}{x-5}dx$.

**4.25.** $\int \frac{\sqrt{\ln^3(x+3)}}{x+3}dx$.

**4.26.** $\int \frac{\ln^5(x-8)}{x-8}dx$.

**4.27.** $\int \frac{\ln(3x+5)}{3x+5}dx$.

**4.28.** $\int \frac{dx}{(x-4)\ln^5(x-4)}$.

**4.29.** $\int \frac{\ln^6(x+9)}{x+9}dx$.

**4.30.** $\int \frac{\ln(3x+5)}{3x+5}dx$.

**Завдання 5**. Обчислити інтеграли.

**5.1.** $\int \frac{\sqrt{\operatorname{arctg}^6 3x}}{1+9x^2}dx$.

**5.2.** $\int \frac{\sqrt[3]{\arcsin x}}{\sqrt{1-x^2}}dx$.

**5.3.** $\int \frac{\arccos^2 3x}{\sqrt{1-9x^2}}\,dx$.

**5.4.** $\int \frac{\operatorname{arcctg}^3 2x}{1+4x^2}\,dx$.

**5.5.** $\int \frac{\sqrt[3]{\arccos^2 x}}{\sqrt{1-x^2}}\,dx$.

**5.6.** $\int \frac{dx}{(1+x^2)\operatorname{arctg}^3 x}$.

**5.7.** $\int \frac{\arccos^3 2x}{\sqrt{1-4x^2}}\,dx$.

**5.8.** $\int \frac{\sqrt[3]{\operatorname{arctg}^2 x}}{1+x^2}\,dx$.

**5.9.** $\int \frac{\arcsin^5 2x}{\sqrt{1-4x^2}}\,dx$.

**5.10.** $\int \frac{dx}{\sqrt{1-x^2}\arcsin^4 x}$.

**5.11.** $\int \frac{\arccos^3 2x}{\sqrt{1-4x^2}}\,dx$.

**5.12.** $\int \frac{\operatorname{arctg}^7 3x}{1+9x^2}\,dx$.

**5.13.** $\int \frac{\arccos 4x}{\sqrt{1-16x^2}}\,dx$.

**5.14.** $\int \frac{\arcsin^4 x}{\sqrt{1-x^2}}\,dx$.

**5.15.** $\int \frac{\arcsin^3 2x}{\sqrt{1-4x^2}}\,dx$.

**5.16.** $\int \frac{dx}{(1+x^2)\operatorname{arctg}^7 x}$.

**5.17.** $\int \frac{\sqrt[3]{\operatorname{arctg} 2x}}{1+4x^2}\,dx$.

**5.18.** $\int \frac{\arccos^6 3x}{\sqrt{1-9x^2}}\,dx$.

**5.19.** $\int \frac{\sqrt{\operatorname{arctg}^3 x}}{1+x^2}\,dx$.

**5.20.** $\int \frac{dx}{(1+x^2)\sqrt{\operatorname{arctg} x}}$.

**5.21.** $\int \frac{dx}{(1+x^2)\operatorname{arctg}^5 x}$.

**5.22.** $\int \frac{\arccos^7 x dx}{\sqrt{1-x^2}}$.

**5.23.** $\int \frac{\sqrt[3]{\arccos 2x}}{\sqrt{1-4x^2}}\,dx$.

**5.24.** $\int \frac{\operatorname{arcctg}^4 5x}{1+25x^2}\,dx$.

**5.25.** $\int \frac{\arcsin^2 5x}{\sqrt{1-25x^2}}\,dx$.

**5.26.** $\int \frac{dx}{\sqrt{1-25x^2}\arcsin 5x}$.

**5.27.** $\int \frac{\operatorname{arctg}^8 3x}{1+9x^2}\,dx$.

**5.28.** $\int \frac{\arccos^2 7x}{\sqrt{1-49x^2}}\,dx$.

**5.29.** $\int \frac{\sqrt[5]{\operatorname{arctg}^3 x}}{1+x^2}\,dx$.

**5.30.** $\int \frac{\operatorname{arcctg}^4 8x}{1+64x^2}\,dx$.

**Завдання 6**. Обчислити інтеграли.

**6.1.** $\int \frac{dx}{4x^2-5x+4}$.

**6.2.** $\int \frac{dx}{x^2-4x+10}$.

**6.3.** $\int \frac{dx}{2x^2-7x+1}$.

**6.4.** $\int \frac{dx}{2x^2+x-6}$.

**6.5.** $\int \frac{dx}{5x^2+2x+7}$.

**6.6.** $\int \frac{dx}{2x^2-2x+1}$.

**6.7.** $\int \frac{dx}{2x^2-11x+2}$.

**6.8.** $\int \frac{dx}{2x^2+x+2}$.

**6.9.** $\int \frac{dx}{3x^2-12x+3}$.

**6.10.** $\int \frac{dx}{2x^2+3x+2}$.

**6.11.** $\int \frac{dx}{x^2-5x+6}$.

**6.12.** $\int \frac{dx}{2x-3-4x^2}$.

**6.13.** $\int \frac{dx}{3x^2-8x-3}$.

**6.14.** $\int \frac{dx}{8-2x-x^2}$.

**6.15.** $\int \frac{dx}{5x-x^2-6}$.

**6.16.** $\int \frac{dx}{\sqrt{4+8x-x^2}}$.

**6.17.** $\int \frac{dx}{\sqrt{3x^2-4x+1}}$.

**6.18.** $\int \frac{dx}{\sqrt{2-3x-2x^2}}$.

**6.19.** $\int \frac{dx}{\sqrt{x^2+6x+8}}$.

**6.20.** $\int \frac{dx}{\sqrt{2+8x-2x^2}}$.

**6.21.** $\int \frac{dx}{\sqrt{3+2x-2x^2}}$.

**6.22.** $\int \frac{dx}{2-2x-3x^2}$.

**6.23.** $\int \frac{dx}{\sqrt{1+x-x^2}}$.

**6.24.** $\int \frac{dx}{\sqrt{5x^2-10x+4}}$.

**6.25.** $\int \frac{dx}{\sqrt{2x+3-x^2}}$.

**6.26.** $\int \frac{dx}{4x^2-8x+3}$.

**6.27.** $\int \frac{dx}{\sqrt{1+2x-x^2}}$.

**6.28.** $\int \frac{dx}{\sqrt{4x^2-x+4}}$.

**6.29.** $\int \frac{dx}{\sqrt{2+4x-3x^2}}$.

**6.30.** $\int \frac{dx}{4x^2+2x+4}$.

**Завдання 7**. Обчислити інтеграли.

**7.1.** $\int \frac{x+1}{2x^2+3x-4}dx$.

**7.2.** $\int \frac{x+6}{3x^2+x+1}dx$.

**7.3.** $\int \frac{2x-1}{3x^2-2x+6}dx$.

**7.4.** $\int \frac{xdx}{2x^2+x+5}dx$.

**7.5.** $\int \frac{x+5}{x^2+x-2}dx$.

**7.6.** $\int \frac{3x-2}{5x^2-3x+2}dx$.

**7.7.** $\int \frac{x+4}{2x^2-6x-8}dx$.

**7.8.** $\int \frac{x+4}{2x^2-7x+1}dx$.

**7.9.** $\int \frac{5x-2}{2x^2-5x+2}dx$.

**7.10.** $\int \frac{4x-1}{4x^2-4x+5}dx$.

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

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

**7.13.** $\int \frac{4x+8}{4x^2+6x-13}dx$.

**7.14.** $\int \frac{5x+1}{x^2-4x+1}dx$.

**7.15.** $\int \frac{xdx}{2x^2+2x+5}dx$.

**7.16.** $\int \frac{2x-13}{\sqrt{3x^2-3x-16}}dx$.

**7.17.** $\int \frac{x-3}{\sqrt{2x^2-4x-1}}dx$.

**7.18.** $\int \frac{x-1}{\sqrt{3x^2-x+5}}dx$.

**7.19.** $\int \frac{2x+1}{\sqrt{1+x-3x^2}}dx$.

**7.20.** $\int \frac{2x+5}{\sqrt{4x^2+8x+9}}dx$.

**7.21.** $\int \frac{2x-10}{\sqrt{1+x-x^2}}dx$.

**7.22.** $\int \frac{2x-8}{\sqrt{1-x+x^2}}dx$.

**7.23.** $\int \frac{3x+4}{\sqrt{x^2+6x+13}}dx$.

**7.24.** $\int \frac{3x-1}{\sqrt{2x^2-5x+1}}dx$.

**7.25.** $\int \frac{5x+2}{\sqrt{x^2+3x-4}}dx$.

**7.26.** $\int \frac{x-4}{\sqrt{2x^2-x+7}}dx$.

**7.27.** $\int \frac{2x-1}{\sqrt{x^2-3x+4}}dx$.

**7.28.** $\int \frac{4x+1}{\sqrt{2+x-x^2}}dx$.

**7.29.** $\int \frac{5x-3}{\sqrt{2x^2+4x-5}}dx$.

**7.30.** $\int \frac{3x+2}{\sqrt{4+2x-x^2}}dx$.

**Завдання 9**. Обчислити інтеграли.

**9.1.** $\int (x-7)\cos 2xdx$.

**9.2.** $\int (x-4)\sin 2xdx$.

**9.3.** $\int (x-5)\cos xdx$.

**9.4.** $\int (x-4)\cos 2xdx$.

**9.5.** $\int (x+8)\sin 3x dx$.

**9.6.** $\int (x+2)\sin\frac{x}{2}dx$.

**9.7.** $\int (x+4)\cos\frac{x}{2}dx$.

**9.8.** $\int (x-9)\sin\frac{x}{2}dx$.

**9.9.** $\int \ln(x-5)dx$.

**9.10.** $\int \operatorname{arctg} 2x dx$.

**9.11.** $\int x^2 e^{-x}dx$.

**9.12.** $\int \operatorname{arctg} 4x dx$.

**9.13.** $\int \arcsin 5x dx$.

**9.14.** $\int x \operatorname{arctg} x dx$.

**9.15.** $\int x^2 e^{3x}dx$.

**9.16.** $\int x\cos(x+4)dx$.

**9.17.** $\int \arcsin 2x dx$.

**9.18.** $\int (x^2-3)e^x dx$.

**9.19.** $\int xe^{-4x}dx$.

**9.20.** $\int \arcsin 3x dx$.

**9.21.** $\int x\sin(x-2)dx$.

**9.22.** $\int x\cos(x+4)dx$.

**9.23.** $\int x\sin(x-5)dx$.

**9.24.** $\int x\cos(x+6)dx$.

**9.25.** $\int \operatorname{arctg}\frac{x}{2}dx$.

**9.26.** $\int \ln(x+8)dx$.

**9.27.** $\int \ln(2x-1)dx$.

**9.28.** $\int \arccos\frac{x}{5}dx$.

**9.29.** $\int \operatorname{arctg}\frac{x}{4}dx$.

**9.30.** $\int \arccos\frac{x}{3}dx$.

**<u>Завдання 11</u>**. Обчислити інтеграли.

**11.1.** $\int \frac{dx}{2+\sqrt{x+3}}$.

**11.2.** $\int \frac{xdx}{\sqrt{x+3}}$.

**11.3.** $\int \frac{x^2dx}{\sqrt{x-3}}$.

**11.4.** $\int \frac{xdx}{2+\sqrt{x+4}}$.

**11.5.** $\int \frac{x^3dx}{\sqrt{x+1}}$.

**11.6.** $\int \frac{x+1}{x\sqrt{x+2}}dx$.

**11.7.** $\int \frac{dx}{(x+1)\sqrt{x+4}}$.

**11.8.** $\int \frac{\sqrt{x+2}}{x-3}dx$.

**11.9.** $\int \frac{dx}{\sqrt{x}+3}$.

**11.10.** $\int \frac{dx}{\sqrt{x}(x+3)}$.

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

**11.12.** $\int \frac{xdx}{\sqrt{x-1}}$.

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

**11.14.** $\int \frac{dx}{3+\sqrt{x+5}}$.

**11.15.** $\int \frac{dx}{1+\sqrt{x-1}}$.

**11.16.** $\int \frac{dx}{x\sqrt{x-7}}$.

**11.17.** $\int \frac{x+1}{x\sqrt{x-1}}dx$.

**11.18.** $\int \frac{x^3dx}{\sqrt{x-7}}$.

**11.19.** $\int \frac{x^2dx}{\sqrt{x-4}}$.

**11.20.** $\int \frac{\sqrt{x+4}}{x}dx$.

**11.21.** $\int \frac{x^3dx}{\sqrt{x+2}}$.

**11.22.** $\int \frac{\sqrt{x}dx}{x+10}$.

**11.23.** $\int \frac{dx}{\sqrt{x}(x-1)}$.

**11.24.** $\int \frac{dx}{1+\sqrt{x-2}}$.

**11.25.** $\int \frac{dx}{x\sqrt{x-2}}$.

**11.26.** $\int \frac{x^2dx}{\sqrt{x-2}}$.

**11.27.** $\int \frac{x-1}{x\sqrt{x-2}}dx$.

**11.28.** $\int \frac{x^3dx}{\sqrt{x+6}}$.

**11.29.** $\int \frac{dx}{3+\sqrt{x-6}}$.

**11.30.** $\int \frac{dx}{2+\sqrt{x-8}}$.

**Завдання 13**. Обчислити інтеграли.

**13.1.** $\int \cos^4 3x \sin^2 3x dx$.

**13.2.** $\int \sqrt[5]{\sin^4 x}\cos^3 3x dx$.

**13.3.** $\int \cos^3 x \sin^8 x dx$.

**13.4.** $\int \cos^4 x \sin^3 x dx$.

**13.5.** $\int \frac{\cos^3 x dx}{\sqrt[3]{\sin^4 x}}$.

**13.6.** $\int \sqrt[5]{\sin^3 2x}\cos^3 2x dx$.

**13.7.** $\int \frac{\cos^3 x}{\sqrt[3]{\sin^2 x}}dx$.

**13.8.** $\int \frac{\sin^3 x}{\sqrt[3]{\cos^4 x}}dx$.

**13.9.** $\int \frac{3\sin^3 x}{\cos^4 x}dx$.

**13.10.** $\int \sin^5 x \cos^4 x dx$.

**13.11.** $\int \frac{\sin^3 x}{\sqrt[5]{\cos^3 x}}dx$.

**13.12.** $\int \sqrt[3]{\cos^2 x}\sin^3 x dx$.

**13.13.** $\int \sqrt[3]{\sin^2 x}\cos^3 x dx$.

**13.14.** $\int \sqrt[5]{\cos^3 2x}\sin^3 2x dx$.

**13.15.** $\int \frac{\cos^3 x dx}{\sqrt[5]{\sin^3 x}}$.

**13.16.** $\int \sin^2 2x \cos^4 2x dx$.

**13.17.** $\int \frac{\sin^3 x}{\sqrt[3]{\cos^2 x}} dx$.

**13.18.** $\int \sqrt[5]{\cos^4 x} \sin^3 x dx$.

**13.19.** $\int \sin^4 2x \cos^2 2x dx$.

**13.20.** $\int \frac{\cos^3 2x}{\sqrt[3]{\sin^2 2x}} dx$.

**13.21.** $\int \frac{\sin^3 2x}{\sqrt[3]{\cos^2 2x}} dx$.

**13.22.** $\int \sin^4 x \cos^3 x dx$.

**13.23.** $\int \sin^2 x \cos^4 x dx$.

**13.24.** $\int \sin^4 x \cos^2 x dx$.

**13.25.** $\int \sin^3 x \cos^8 x dx$.

**13.26.** $\int \frac{3\cos^3 x}{\sin^4 x} dx$.

**13.27.** $\int \sin^5 x \sqrt[5]{\cos^3 x} dx$.

**13.28.** $\int \sin^4 x \cos^5 x dx$.

**13.29.** $\int \sin^4 3x \cos^2 3x dx$.

**13.30.** $\int \frac{\sin^3 x}{\sqrt[3]{\cos^4 x}} dx$.

**<u>Завдання 14</u>**. Користуючись формулою Ньютона-Лейбніца, обчислити інтеграли.

**14.1.** $\int_0^{\sqrt{3}} x \sqrt[3]{1+x^2} dx$.

**14.2.** $\int_0^{12\sqrt{3}} \frac{12x^5 dx}{\sqrt{x^6+1}}$.

**14.3.** $\int_0^1 \frac{x^2 dx}{x^2+1}$.

**14.4.** $\int_0^{\pi/2} \sin x \cos^2 x dx$.

**14.5.** $\int_0^{\pi/2} \frac{\cos x}{1+\cos x} dx$.

**14.6.** $\int_{3/4}^{4/3} \frac{dx}{x^2+1}$.

**14.7.** $\int_0^{-3} \frac{dx}{\sqrt{25+3x}}$.

**14.8.** $\int_0^2 \frac{x^3 dx}{\sqrt{x^4+4}}$.

**14.9.** $\int_1^e \frac{1+\ln x}{x} dx$.

**14.10.** $\int_0^1 \frac{x^3}{x^8+1} dx$.

**14.11.** $\int_{\pi/4}^{\pi/2} \frac{dx}{1-\cos^2 x}$.

**14.12.** $\int_2^5 \frac{dx}{\sqrt{5+4x-x^2}}$.

**14.13.** $\int_0^1 x^3 \sqrt{4+5x^4} dx$.

**14.14.** $\int_{-\pi}^{\pi} \sin^2 \frac{x}{2} dx$.

**14.15.** $\int_1^2 \frac{e^{1/x}}{x^2}dx$.

**14.16.** $\int_0^{1/2} \frac{xdx}{\sqrt{1-x^2}}$.

**14.17.** $\int_0^1 3(x^2+x^2e^{x^3})dx$.

**14.18.** $\int_{\pi^2/9}^{\pi^2} \frac{\cos\sqrt{x}}{\sqrt{x}}dx$.

**14.19.** $\int_1^{\sqrt{3}} \frac{x^2dx}{1+x^6}$.

**14.20.** $\int_1^e \frac{\sin\ln x}{x}dx$.

**14.21.** $\int_1^{\sqrt{e}} \frac{dx}{x\sqrt{1-\ln^2 x}}$.

**14.22.** $\int_3^8 \sqrt{x+1}dx$.

**14.23.** $\int_{\pi/6}^{\pi/2} \sin x\cos^3 x\,dx$.

**14.24.** $\int_{\pi/18}^{\pi/6} 12\operatorname{ctg}3xdx$.

**14.25.** $\int_0^1 \frac{dx}{\sqrt{4-3x}}$.

**14.26.** $\int_1^{\sqrt{2}} \frac{xdx}{\sqrt{4-x^2}}$.

**14.27.** $\int_1^e \frac{\ln^2 x}{x}dx$.

**14.28.** $\int_{-1}^0 \frac{dx}{4x^2-9}$.

**14.29.** $\int_{\pi/6}^{\pi/2} \cos\alpha\sin^3\alpha d\alpha$.

**14.30.** $\int_0^{\sqrt{\pi}/4} \frac{xdx}{\cos^2(x^2)}$.

**<u>Завдання 15</u>**. Обчислити невласні інтеграли або довести їх розбіжність.

**15.1.** а) $\int_0^\infty \frac{xdx}{16x^4+1}$; б) $\int_0^1 \frac{dx}{\sqrt[3]{2-4x}}$.

**15.2.** а) $\int_1^\infty \frac{16xdx}{16x^4-1}$; б) $\int_1^3 \frac{dx}{\sqrt{x^2-6x+9}}$.

**15.3.** а) $\int_0^\infty \frac{x^3dx}{\sqrt{16x^4+1}}$; б) $\int_0^{1/3} \frac{e^{3+\frac{1}{x}}}{x^2}dx$.

**15.4.** а) $\int_1^\infty \frac{xdx}{\sqrt{16x^4-1}}$; б) $\int_1^3 \frac{dx}{\sqrt[3]{(3-x)^5}}$.

**15.5.** а) $\int_{-\infty}^0 \frac{xdx}{\sqrt{(x^2+4)^3}}$; б) $\int_{1/3}^1 \frac{\ln(3x-1)}{3x-1}dx$.

**15.6.** а) $\int\limits_0^{\infty} \frac{x^2 dx}{\sqrt[3]{(x^3+8)^4}}$; б) $\int\limits_{1/4}^{1} \frac{dx}{20x^2-9x+1}$.

**15.7.** а) $\int\limits_0^{\infty} \frac{xdx}{\sqrt[4]{(16+x^2)^5}}$; б) $\int\limits_{1/2}^{1} \frac{\ln 2 dx}{(1-x)\ln^2(1-x)}$.

**15.8.** а) $\int\limits_4^{\infty} \frac{xdx}{\sqrt{x^2-4x+1}}$; б) $\int\limits_0^{2/3} \frac{\sqrt[3]{\ln(2-3x)}}{2-3x} dx$.

**15.9.** а) $\int\limits_{-1}^{\infty} \frac{dx}{\pi(x^2+4x+5)}$; б) $\int\limits_0^{1} \frac{xdx}{1-x^4}$.

**15.10.** а) $\int\limits_{-1}^{\infty} \frac{xdx}{x^2+4x+5}$; б) $\int\limits_0^{\pi/6} \frac{\cos 3x}{\sqrt[6]{(1-\sin 3x)^5}} dx$.

**15.11.** а) $\int\limits_0^{\infty} \frac{\operatorname{arctg} 2x}{\pi(1+4x^2)} dx$; б) $\int\limits_0^{1} \frac{2xdx}{\sqrt{1-x^4}}$.

**15.12.** а) $\int\limits_{1/2}^{\infty} \frac{16dx}{\pi(4x^2+4x+5)}$; б) $\int\limits_{-1/3}^{0} \frac{dx}{\sqrt[3]{1+3x}}$.

**15.13.** а) $\int\limits_0^{\infty} \frac{xdx}{4x^2+4x+5}$; б) $\int\limits_{3/4}^{1} \frac{dx}{\sqrt[5]{3-4x}}$.

**15.14.** а) $\int\limits_0^{\infty} \frac{(x+2)dx}{\sqrt[3]{(x^2+4x+1)^4}}$; б) $\int\limits_0^{\pi/2} \frac{e^{\operatorname{tg} x}}{\cos^2 x} dx$.

**15.15.** а) $\int\limits_0^{\infty} \frac{3-x^2}{x^2+4} dx$; б) $\int\limits_0^{1} \frac{2e^{1-\frac{2}{\pi}\arcsin x}}{\pi\sqrt{1-x^2}} dx$.

**15.16.** а) $\int\limits_0^{\infty} \frac{x^2 dx}{\sqrt[3]{(x^3+8)^4}}$; б) $\int\limits_1^{2} \frac{dx}{\sqrt[5]{4x-x^2-4}}$.

**15.17.** а) $\int\limits_0^{\infty} \frac{xdx}{\sqrt[4]{(16+x^2)^5}}$; б) $\int\limits_{\pi/2}^{\pi} \frac{\sin x dx}{\sqrt[7]{\cos^2 x}}$.

**15.18.** а) $\int\limits_0^{\infty} \sqrt{\frac{2}{\pi}} \frac{\sqrt{\operatorname{arctg} 2x}}{1+4x^2} dx$; б) $\int\limits_{-3/4}^{0} \frac{dx}{\sqrt{4x+3}}$.

**15.19.** а) $\int\limits_1^{\infty} \frac{4dx}{x(1+\ln^2 x)}$; б) $\int\limits_1^{2} \frac{xdx}{\sqrt{(x^2-1)^3 \ln 2}}$.

**15.20.** а) $\int\limits_0^{\infty} x\sin x dx$; б) $\int\limits_0^{1/3} \frac{dx}{9x^2-9x+2}$.

**15.21.** а) $\int\limits_{-\infty}^{-1} \frac{7dx}{(x^2-4x)\ln 5}$; б) $\int\limits_0^{\pi/2} \frac{3\sin^3 x dx}{\sqrt{\cos x}}$.

**15.22.** а) $\int\limits_{1/3}^{\infty} \frac{\pi dx}{(1+9x^2)\operatorname{arctg}^2 3x}$; б) $\int\limits_0^{3} \frac{\sqrt[3]{9}x dx}{\sqrt[3]{9-x^2}}$.

**15.23.** а) $\int\limits_2^{\infty} \frac{dx}{(4+x^2)\sqrt{\pi \operatorname{arctg}\frac{x}{2}}}$; б) $\int\limits_0^{1} \frac{x^4 dx}{\sqrt[3]{1-x^5}}$.

**15.24.** а) $\int\limits_1^{\infty} \frac{dx}{(x^2+2x)\ln 3}$; б) $\int\limits_0^{2} \frac{x^2 dx}{\sqrt{64-x^6}}$.

**15.25.** а) $\int\limits_0^{\infty} e^{-3x} x dx$; б) $\int\limits_{1/2}^{1} \frac{dx}{\sqrt[9]{1-2x}}$.

**15.26.** а) $\int\limits_{-\infty}^{0} \left(\frac{x^2}{x^3-1} - \frac{x}{1+x^2}\right) dx$; б) $\int\limits_1^{5} \frac{x^2 dx}{\sqrt{31(x^2-1)}}$.

**15.27.** а) $\int\limits_0^{\infty} \frac{dx}{2x^2-2x+1}$; б) $\int\limits_1^{3/2} \frac{dx}{\sqrt{3x-x^2-2}}$.

**15.28.** а) $\int\limits_1^{\infty} \frac{dx}{x^2(x+1)}$; б) $\int\limits_0^{4} \frac{10x dx}{\sqrt[4]{(16-x^2)^3}}$.

**15.29.** а) $\int\limits_{e^2}^{\infty} \frac{dx}{x(\ln x-1)^2}$; б) $\int\limits_0^{1/4} \frac{dx}{\sqrt[3]{1-4x}}$.

**15.30.** а) $\int\limits_1^{\infty} \frac{10x dx}{(6x^2-5x+1)\ln\frac{3}{4}}$; б) $\int\limits_0^{1/2} \frac{dx}{(2x-1)^2}$.