8.1.1.

1) $\int \frac{dx}{x^3} = \int x^{-3} dx = \frac{x^{-3+1}}{-3+1} + C = \frac{x^{-2}}{-2} + C =$

$= \frac{1}{2x^2} + C$

2) $\int \frac{dx}{\sqrt{x^3}} = \int \frac{dx}{x^{\frac{3}{2}}} = \int x^{-\frac{3}{2}} dx = \frac{x^{-\frac{3}{2}+1}}{-\frac{3}{2}+1} + C =$

$\frac{x^{-\frac{1}{2}}}{-\frac{1}{2}} + C = -\frac{2}{\sqrt{x}} + C$

3) $\int 2^x dx = \frac{2^x}{\ln 2} + C$

4) $\int \frac{dx}{\sqrt{5-x^2}} = \int \frac{dx}{\sqrt{(\sqrt{5})^2 - x^2}} = \arcsin \frac{x}{\sqrt{5}} + C$

5) $\int \frac{dx}{\sqrt{x^2-7}} = \ln|x + \sqrt{x^2-7}| + C$

8.1.8

1) $\int (3 \cdot 5^x - \frac{2}{\sqrt[3]{x}} + 7) dx = \int 3 \cdot 5^x dx - \int \frac{2}{\sqrt[3]{x}} dx +$

$+ \int 7 dx = 3 \int 5^x dx - 2 \int \frac{1}{\sqrt[3]{x}} dx + 7 \int dx =$

$= \frac{3 \cdot 5^x}{\ln a} - 2 \cdot \frac{x^{-\frac{1}{3}+1}}{-\frac{1}{3}+1} + 7x + C = \frac{3 \cdot 5^x}{\ln a} -$

$- 3 \cdot \sqrt[3]{x^2} + 7x + C$

2) $\int \frac{x^2 - 3x + 5}{\sqrt{x}} dx = \int (x^{\frac{3}{2}} - 3x^{\frac{1}{2}} + 5x^{-\frac{1}{2}}) dx =$

$= \int x^{\frac{3}{2}} dx - 3 \int x^{\frac{1}{2}} dx + 5 \int x^{-\frac{1}{2}} dx =$

$$\frac{x^{\frac{3}{2}+1}}{\frac{3}{2}+1} - 3\frac{x^{\frac{1}{2}+1}}{\frac{1}{2}+1} + 5\cdot\frac{x^{-\frac{1}{2}+1}}{-\frac{1}{2}+1} + C = \frac{2}{5}x^{\frac{5}{2}}$$

$$-2x^{\frac{3}{2}} + 10x^{\frac{1}{2}} + C$$

8.1.15 $\int\frac{dx}{\sqrt{16-9x^2}} = \int\frac{dx}{\sqrt{16-(3x)^2}} = \frac{1}{3}\arcsin\frac{3x}{4} +$

$+C$

8.1.22 $\int\sin^2 x\,dx = \int\frac{1-\cos 2x}{2}dx = \frac{1}{2}\int\cdot$

$\cdot\int(1-\cos 2x)dx = \frac{1}{2}\left(\int dx - \int\cos 2x\,dx\right) =$

$= \frac{1}{2}\left(x - \frac{\sin 2x}{2}\right) + C = \frac{x}{2} - \frac{\sin 2x}{4} + C$

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

$$\int\frac{x^2}{x^2+1}dx = \int(1-\frac{1}{x^2+1}dx = \int dx - \int\frac{dx}{x^2+1} =$$

$= x - \mathrm{arctg}\, x + C$

8.1.2 $\int x^{10}dx = \frac{x^{10+1}}{10+1} + C = \frac{x^{11}}{11} + C$

8.1.3 $\int\frac{dx}{x^7} = \int x^{-7}dx = \frac{x^{-7+1}}{-7+1} + C = \frac{x^{-6}}{-6} + C =$

$= \frac{1}{-6x^6} + C$

8.1.4. $\int \sqrt[4]{x}\,dx = \int x^{\frac{1}{4}}\,dx = \frac{x^{\frac{1}{4}+1}}{\frac{1}{4}+1} + C =$
$= \frac{x^{\frac{5}{4}}}{1,25} + C = \frac{\sqrt[4]{x^5}}{1,25} + C$

8.1.5 $\int \frac{dx}{x^2+9} = \frac{1}{3}\operatorname{arctg}\frac{x}{3} + C$

8.1.6 $\int \frac{dx}{x^2 - \frac{1}{2}} = \frac{1}{2\sqrt{\frac{1}{2}}} \ln\left|\frac{x - \sqrt{\frac{1}{2}}}{x + \sqrt{\frac{1}{2}}}\right| + C$

8.1.7 $\int \frac{dx}{\sqrt{x^2+3}} = \ln|x + \sqrt{x^2+3}| + C$

8.1.9 $\int \frac{x^4 + x^2 - 6x}{x^3}\,dx = \int (x + \frac{1}{x} - \frac{6}{x^2})\,dx$
$= \int x\,dx + \int \frac{1}{x}\,dx - 6\int \frac{1}{x^2}\,dx = \frac{x^2}{2} +$
$+ \ln|x| + \frac{6}{x} + C$

8.1.10 $\int \left(\frac{5}{x} - \frac{10}{\sqrt[4]{x^3}} - \frac{3}{x^2+7}\right) dx = \int \frac{5}{x}\,dx -$
$- \int \frac{10}{\sqrt[4]{x^3}}\,dx - \int \frac{3}{x^2+7}\,dx = 5\int \frac{1}{x}\,dx - 10\int x^{-\frac{3}{4}}\,dx$
$- 3\int \frac{1}{x^2+7}\,dx = 5\ln|x| - 2,5\sqrt[4]{x} - \frac{3}{\sqrt{7}} \cdot$
$\cdot \operatorname{arctg}\frac{x}{\sqrt{7}} + C$

8.1.11 $\int \sqrt{x}\,(x^2+1)\,dx = \int (x^{\frac{5}{2}} + x^{\frac{1}{2}})\,dx =$
$\int x^{\frac{5}{2}}\,dx + \int x^{\frac{1}{2}}\,dx = \frac{x^{3,5}}{3,5} + \frac{\sqrt[2]{x^3}}{1,5} + C$

8.1.12 $\int \frac{3+\sqrt{4-x^2}}{\sqrt{4-x^2}}\,dx = 3\int \frac{1}{\sqrt{4-x^2}}\,dx +$

$+ \int \frac{\sqrt{4-x^2}}{\sqrt{4-x^2}}\,dx = 3\arcsin\frac{x}{2} + x + C$

8.1.13 $\int \frac{(x^3+2)^2\,dx}{\sqrt{x}} = \int \frac{x^6+4x^3+4}{\sqrt{x}}\,dx =$

$= \int \left(x^{\frac{11}{2}} + 4x^{\frac{5}{2}} + 4x^{-\frac{1}{2}}\right)dx = \int x^{\frac{11}{2}}dx +$

$+ 4\int x^{\frac{5}{2}}dx + 4\int x^{-\frac{1}{2}}dx = \frac{\sqrt[2]{x^{13}}}{6,5} + 4\cdot\frac{\sqrt[2]{x^7}}{3,5} +$

$+ \frac{4\sqrt{x}}{0,5} + C = \frac{x^6\sqrt{x}}{6,5} + \frac{4x^3\sqrt{x}}{3,5} + 2\sqrt{x} + C$

8.1.14. $\int \left(4\sin x + 8x^3 - \frac{11}{\cos^2 x}\right)dx = 4\int \sin x\,dx +$

$+ 8\int x^3 dx - 11\int \frac{1}{\cos^2 x}\,dx = -4\cos x +$

$+ 2x^4 - 11\,\mathrm{tg}\,x + C$

8.1.16 $\int \cos 2x\,dx = \frac{\sin 2x}{2} + C$

8.1.17 $\int (9x+2)^{17}dx = \frac{(9x+2)^{17+1}}{(17+1)\cdot 9} + C =$

$= \frac{(9x+2)^{18}}{162} + C$

8.1.18 $\int \frac{dx}{8x-1} = \int \cancel{(8x-1)^{-1}dx} = \frac{1}{8}\ln|8x-1| + C$