

Distance Learning. Higher Mathematics.
ASSIGNMENTS.
Period: 17 March 2020 – 2 April 2020

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The control tasks to the chapter 6

Task 1. Find the following indefinite integrals.

$$6.1.1. a) \int \sin^3 x \cos x dx; b) \int \frac{x}{\sin^2 x} dx; c) \int \frac{dx}{\sin x + \cos x};$$

$$d) \int \frac{(x+2)dx}{\sqrt{x^2+3x+1}}; e) \int \frac{3x^2-6x+1}{x^3-3x^2+2x} dx; f) \int \frac{(1+\sqrt{x})^2}{x^4\sqrt{x^3}} dx.$$

$$6.1.2. a) \int \frac{\arcsin \ln x}{x} dx; b) \int x^2 e^{-x} dx; c) \int \frac{dx}{2 \sin x + 3 \cos x + 1};$$

$$d) \int \frac{(4x+1)dx}{\sqrt{-x^2-2x+1}}; e) \int \frac{2x^2-6x+1}{(x-1)^2(x-2)} dx; f) \int \frac{(1+\sqrt[3]{x})^3}{x\sqrt{x}} dx.$$

$$6.1.3. a) \int \sin 4x e^{\sin 2x} dx; b) \int \frac{x}{\cos^2 x} dx; c) \int \frac{\cos^2 x dx}{\sin^4 x};$$

$$d) \int \frac{(7x-1)dx}{\sqrt{3x^2-6x+4}}; e) \int \frac{x^2-9x+14}{(x^2-4x+3)(x-4)} dx; f) \int \frac{e^{\sqrt{x}} \arctg e^{\sqrt{x}}}{2\sqrt{x}} dx.$$

$$6.1.4. a) \int \sin^3 x \cos^{15} x dx; b) \int x^2 \sin 2x dx; c) \int \frac{dx}{7 \cos x - 6 \sin x + 9};$$

$$d) \int \frac{(4x+3)dx}{\sqrt{-x^2+2x+4}}; e) \int \frac{3x^2-12x+10}{(x^2-5x+6)(x-2)} dx; f) \int \frac{(1+\sqrt[3]{x^2})^2}{x^9\sqrt{x^8}} dx.$$

$$6.1.5. a) \int \frac{dx}{2 \sin x + 3 \cos x + 2}; b) \int x^2 \cos 5x dx; c) \int \frac{\arcsin \frac{1}{x+1}}{(x+1)^2} dx;$$

$$d) \int \frac{(3x+4)dx}{\sqrt{9x^2+6x-5}}; e) \int \frac{2x^2+21x+50}{(x-6)^2(x-2)} dx; f) \int \frac{(1+\sqrt[3]{x^2})^2}{x^2\sqrt[9]{x}} dx.$$

$$6.1.6. a) \int e^{\frac{x^2}{2}} dx; b) \int x \ln(x^2-6x-27) dx; c) \int \frac{\sin^3 x}{\cos^{17} x} dx;$$

$$d) \int \frac{(1-4x)dx}{\sqrt{-x^2-x+2}}; e) \int \frac{5x^2-18x+8}{(x^2-3x+2)(x-6)} dx; f) \int \frac{\left(1+\sqrt[3]{x^2}\right)^3}{x^2} dx.$$

$$6.1.7. a) \int \sin^3 x \cos^9 x dx; b) \int \ln(x-1) dx; c) \int \frac{dx}{18 \cos x - \sin x + 17};$$

$$d) \int \frac{(2-5x)dx}{\sqrt{4x^2-8x+1}}; e) \int \frac{3x^2+2x-1}{(x+3)(x-1)(x-5)} dx; f) \int \frac{\arccos \frac{1}{x}}{x \ln^2 x} dx.$$

$$6.1.8. a) \int \frac{\arctg \frac{1}{x}}{x^2} dx; b) \int e^{\frac{x}{2}} x^2 dx; c) \int \frac{dx}{\sin^2 x \cos x};$$

$$d) \int \frac{(4x-1)dx}{\sqrt{-x^2-2x+3}}; e) \int \frac{2x^2+3x-2}{(x^2-4x-12)(x+2)} dx; f) \int \frac{(1+\sqrt{x})^3}{x^8 \sqrt{x^7}} dx.$$

$$6.1.9. a) \int \frac{\arccos^2 x}{\sqrt{1-x^2}} dx; b) \int \ln^2 x dx; c) \int \frac{dx}{3 \sin x + 11 \cos x + 12};$$

$$d) \int \frac{(5x-3)dx}{\sqrt{2x^2-4x+5}}; e) \int \frac{6x^2+25x+16}{(x+4)(x+1)(x+2)} dx; f) \int \frac{\left(1+\sqrt[3]{x^2}\right)^3}{x^2 \sqrt[6]{x}} dx.$$

$$6.1.10. a) \int \frac{\arctg^3 x}{1+x^2} dx; b) \int x^2 e^{5x} dx; c) \int \frac{dx}{\cos^3 x \sin x};$$

$$d) \int \frac{(3x+2)dx}{\sqrt{-x^2+x+4}}; e) \int \frac{-4x^2+14x+11}{(x+1)^2(x-6)} dx; f) \int \frac{\left(1+\sqrt[4]{x^3}\right)^2}{\sqrt[3]{x^2}} dx.$$

$$6.1.11. a) \int \sin^3 x \cos^{12} x dx; b) \int x^2 e^x dx; c) \int \frac{dx}{8 \cos x + \sin x + 9};$$

$$d) \int \frac{(2x+4)dx}{\sqrt{4x^2-x-11}}; e) \int \frac{2x^2-3x-7}{(x-1)(x+2)(x-5)} dx; f) \int \frac{\sqrt{x+1}}{1+\sqrt[3]{x+1}} dx.$$

$$6.1.12. a) \int \frac{e^{\operatorname{tg} x}}{\cos^2 x} dx; b) \int \frac{x}{\sin^2 2x} dx; c) \int \frac{dx}{\cos^2 x \sin x};$$

$$d) \int \frac{(-3x+1)dx}{\sqrt{-x^2+3x-1}}; e) \int \frac{5x^2-31x+31}{(x-1)^2(x-6)} dx; f) \int \frac{(1+\sqrt{x})^2}{x^{10}\sqrt{x^9}} dx.$$

$$6.1.13. \quad a) \int \sin^{13} x \cos^3 x dx; b) \int x^2 3^x dx; c) \int \frac{dx}{5 \cos x - 5 \sin x + 7};$$

$$d) \int \frac{(-3x+6)dx}{\sqrt{6x^2-2x-7}}; e) \int \frac{7x^2-20x-3}{(x^2-1)(x-5)} dx; f) \int \frac{dx}{(1+\sqrt[3]{x})\sqrt{x}}.$$

$$6.1.14. \quad a) \int \frac{e^{ctgx}}{\sin^2 x} dx; b) \int x^3 e^{3x} dx; c) \int \frac{dx}{\cos x \sin^3 x};$$

$$d) \int \frac{(3x-2)dx}{\sqrt{-x^2-3x-2}}; e) \int \frac{3x^2+29x+69}{(x+5)^2(x+4)} dx; f) \int \frac{(1+\sqrt[3]{x^2})^2}{x^2 \sqrt[5]{x}} dx.$$

$$6.1.15. \quad a) \int \frac{\cos x}{\sin^{11} x} dx; b) \int \frac{x}{\sin^2 x} dx; c) \int \frac{dx}{25 \cos x + 2 \sin x + 23};$$

$$d) \int \frac{(4-x)dx}{\sqrt{x^2+8x+3}}; e) \int \frac{3x^2-20x+22}{(x^2-x+1)(x-4)} dx; f) \int \frac{e^{\sqrt{x^3+1}} x^2}{\sqrt{x^3+1}} dx.$$

$$6.1.16. \quad a) \int \frac{\arcsin^3 x}{\sqrt{1-x^2}} dx; b) \int x^3 e^{-2x} dx; c) \int \frac{dx}{\cos x \sin^2 x};$$

$$d) \int \frac{(3x-4)dx}{\sqrt{-x^2-x+5}}; e) \int \frac{x^2-12x+14}{(x^2-8x+15)(x-3)} dx; f) \int \frac{(1+\sqrt[5]{x^4})^2}{x^2 \sqrt[25]{x^{11}}} dx.$$

$$6.1.17. \quad a) \int \frac{\sin x}{\cos^{12} x} dx; b) \int x \arctg x dx; c) \int \frac{dx}{5 \cos x + 3 \sin x + 3};$$

$$d) \int \frac{(1-x)dx}{\sqrt{3x^2-2x-8}}; e) \int \frac{3x^2+x+3}{(x^2+3x-4)(x-3)} dx; f) \int \frac{dx}{\sqrt{x+2} + \sqrt[3]{(x+2)^2}}.$$

$$6.1.18. \quad a) \int \frac{\arccctg \sqrt{x}}{\sqrt{x}} dx; b) \int x^3 e^{-x} dx; c) \int \frac{\sin^2 x}{\cos^4 x} dx;$$

$$d) \int \frac{(2x+5)dx}{\sqrt{-x^2+2x+1}}; e) \int \frac{x^2+7x-37}{(x-4)^2(x+3)} dx; f) \int \frac{(1+\sqrt{x})^2}{x^3 \sqrt{x^2}} dx.$$

$$6.1.19. \quad a) \int \cos^{15} x \sin x dx; b) \int e^{\frac{3x}{4}} \cos 3x dx; c) \int \frac{dx}{2 \cos x - 3 \sin x + 1};$$

$$d) \int \frac{(x+3)dx}{\sqrt{4x^2 + 6x + 1}}; e) \int \frac{x^2 - 6x + 6}{(x^2 - 5x + 4)(x-2)} dx; f) \int \frac{x + \sqrt{x} + \sqrt[3]{x^2}}{x(1 + \sqrt[3]{x})} dx.$$

$$6.1.20. \quad a) \int \frac{x}{1+x^4} dx; b) \int x^3 e^x dx; c) \int \frac{\sin^4 x}{\cos^6 x} dx;$$

$$d) \int \frac{(2x+3)dx}{\sqrt{-x^2 - 3x + 4}}; e) \int \frac{x^2 - 9x + 22}{(x^2 - 6x + 8)(x-4)} dx; f) \int \frac{(1 + \sqrt[3]{x})^3}{x^9 \sqrt{x^4}} dx.$$

$$6.1.21. \quad a) \int \sin^{11} x \cos x dx; b) \int \frac{\ln x}{x^2} dx; c) \int \frac{dx}{7 \cos x - \sin x + 5};$$

$$d) \int \frac{(1-5x)dx}{\sqrt{x^2 + x + 9}}; e) \int \frac{5x^2 + 16x + 2}{(x^2 - 5x + 4)(x+2)} dx; f) \int \frac{\arccos \frac{x-1}{x}}{x^2} dx.$$

$$6.1.22. \quad a) \int \frac{\operatorname{arctg} \sqrt{1-2x}}{\sqrt{1-2x}} dx; b) \int x^3 e^{-\pi^2 x} dx; c) \int \frac{\cos^4 x}{\sin^6 x} dx;$$

$$d) \int \frac{(1-2x)dx}{\sqrt{-x^2 - 3x + 4}}; e) \int \frac{x^2 - 3x - 13}{(x^2 + 4x + 4)(x+5)} dx; f) \int \frac{(1 + \sqrt[3]{x})^2}{x^9 \sqrt{x^5}} dx.$$

$$6.1.23. \quad a) \int \frac{\sin^5 x}{\cos^9 x} dx; b) \int \operatorname{arctg} 4x dx; c) \int \frac{dx}{11 \cos x + 8 \sin x + 13};$$

$$d) \int \frac{(3x+2)dx}{\sqrt{6x^2 + 3x + 5}}; e) \int \frac{4x^2 - 13x + 3}{(x^2 - 1)(x-4)} dx; f) \int \frac{(1 + \sqrt{x})^2}{x^6 \sqrt{x^5}} dx.$$

$$6.1.24. \quad a) \int \frac{\sqrt{\ln x}}{x} dx; b) \int x^3 e^x dx; c) \int \sin^2 x \cos^4 x dx;$$

$$d) \int \frac{(3-2x)dx}{\sqrt{-x^2 + 5x - 6}}; e) \int \frac{x^2 - 9x - 21}{(x+2)^2 (x-5)} dx; f) \int \frac{(1 + \sqrt[3]{x})^3}{x^{12} \sqrt{x^7}} dx.$$

$$6.1.25. \quad a) \int \frac{\cos^3 x}{\sin^{18} x} dx; b) \int x \operatorname{arctg} 2x dx; c) \int \frac{dx}{\cos x + 2 \sin x + 2};$$

6.1.26. $d) \int \frac{(4x+6)dx}{\sqrt{4x^2+5x+3}}; e) \int \frac{-x^2+x+6}{(x^2-3x+2)(x-4)} dx; f) \int \frac{\sqrt{x+1}}{1+\sqrt[3]{x+1}} dx.$
 $a) \int \frac{\ln^3(x-1)}{x-1} dx; b) \int xe^{-2x} dx; c) \int \cos^2 x \sin^4 x dx;$

6.1.27. $d) \int \frac{(5-2x)dx}{\sqrt{-x^2+6x-5}}; e) \int \frac{x^2-9x+32}{(x-5)^2(x-2)} dx; f) \int \frac{\left(1+\sqrt[4]{x^3}\right)^2}{x^2\sqrt[3]{x}} dx.$

6.1.28. $a) \int \frac{\cos^3 x}{\sin^{12} x} dx; b) \int x^2 e^{\frac{x}{4}} dx; c) \int \frac{dx}{7\sin x-19\cos x-17};$
 $d) \int \frac{(3x+2)dx}{\sqrt{3x^2+x+8}}; e) \int \frac{2x^2-3x-6}{x(x^2+5x+6)} dx; f) \int \frac{\left(1+\sqrt[4]{x^3}\right)^2}{x^2\sqrt[4]{x}} dx.$

6.1.29. $a) \int \frac{e^{2x} \arccos e^{2x}}{\sqrt{1-e^{4x}}} dx; b) \int xe^{4x} dx; c) \int \frac{\sin^2 x}{\cos^6 x} dx;$
 $d) \int \frac{(3+x)dx}{\sqrt{-x^2+6x-1}}; e) \int \frac{4x^2-18x+43}{(x^2-8x+4)(x-4)} dx; f) \int \frac{\left(1+\sqrt[3]{x}\right)^2}{x^5\sqrt{x^3}} dx.$

6.1.30. $a) \int \frac{\sin^5 x}{\cos^3 x} dx; b) \int x^2 e^{\frac{x}{2}} dx; c) \int \frac{dx}{-3\cos x+\sin x-1};$
 $d) \int \frac{(2x-3)dx}{\sqrt{3x^2+x+1}}; e) \int \frac{3x^2-7x+1}{(x^2-3x+2)(x+3)} dx; f) \int \frac{\left(1+\sqrt[4]{x^3}\right)^2}{x^2\sqrt[20]{x^7}} dx.$

6.1.30. $a) \int \frac{\arctg(x+1)}{2+2x+x^2} dx; b) \int x \cos^2 x dx; c) \int \frac{\cos^2 x}{\sin^8 x} dx;$
 $d) \int \frac{(x-5)dx}{\sqrt{-3x^2+x+1}}; e) \int \frac{5x^2-6x-7}{(x^2-x-6)(x-3)} dx; f) \int \frac{\left(1+\sqrt[5]{x^4}\right)^2}{x^2\sqrt[5]{x}} dx.$

Task 2. Find the following indefinite integrals.

$$6.2.1. \quad a) \int \frac{5 + \ln(x+5)}{x+5} dx \quad b) \int \frac{2x dx}{\sqrt{x^2 + x - 5}} \quad c) \int \frac{\cos^3 x dx}{\sin^3 x}$$

$$d) \int \frac{6x^2 + 9}{(x+1)(x+2)^2(x^2 + 1)} dx \quad e) \int \operatorname{arctg} \sqrt{2x+1} dx \quad f) \int \frac{\sqrt{x}-1}{\sqrt[3]{x+1}} dx$$

$$g) \int \frac{dx}{5 + 3 \cos x} \quad h) \int \sqrt{81 - x^2} dx$$

$$6.2.2. \quad a) \int \frac{2 \operatorname{arctg}(2x) - x}{1 + 4x^2} dx \quad b) \int \frac{(x-1) dx}{3x^2 - 3x + 4} \quad c) \int \frac{\sin^3 x dx}{\cos^4 x}$$

$$d) \int \frac{(x^3 + 13x + 9) dx}{(x+2)(x-2)^2(x^2 + 4)} \quad e) \int \ln(3x^2 - 2) dx \quad f) \int \frac{dx}{(2-x)\sqrt{1-x}}$$

$$g) \int \frac{dx}{2 \sin x - 3 \cos x} \quad h) \int \frac{dx}{(16 + x^2)\sqrt{16 + x^2}}$$

$$6.2.3. \quad a) \int \frac{(x - \sin x) dx}{x^2 + 2 \cos x} \quad b) \int \frac{dx}{x\sqrt{3-x-x^2}} \quad c) \int \frac{dx}{\sin^3 x \cos^5 x}$$

$$d) \int \frac{3x^3 + 6x^2 + 5x - 1}{x(x+1)^2(x^2 + 2)} dx \quad e) \int (6x^2 - 2) \cos 2x dx$$

$$f) \int \frac{dx}{\sqrt{x+1} + \sqrt{(x+1)^3}} \quad g) \int \frac{\cos x dx}{1 + \cos x} \quad h) \int \frac{dx}{(\sqrt{5-x^2})^3}$$

$$6.2.4. \quad a) \int \frac{8x - (\operatorname{arctg} 2x)^2}{1 + 4x^2} dx \quad b) \int \frac{dx}{(x-1)\sqrt{x^2 + x + 1}} \quad c) \int \frac{dx}{\cos^3 x \sin^3 x}$$

$$d) \int \frac{2x^3 - 4x^2 - 16x - 12}{(x-1)^2(x^2 + 4x + 5)} dx \quad e) \int (x^2 - 1) \sin 3x dx$$

$$f) \int \frac{\sqrt{x+1} + 1}{(x+1)^2 + \sqrt{x+1}} dx \quad g) \int \frac{\sin x dx}{1 - \sin x} \quad h) \int \frac{x^4 dx}{\sqrt{(1-x^2)^3}}$$

$$6.2.5. \quad a) \int \frac{(x^3 - x)dx}{x^4 + 1} \quad b) \int \frac{(3 - x)dx}{\sqrt{2 + x - 2x^2}} \quad c) \int \frac{dx}{\operatorname{tg} x \cos 2x}$$

$$d) \int \frac{x^3 + 4x^2 + 3x + 2}{x^2(x^2 + 1)} dx \quad e) \int (2x^2 + 2)e^{3x} dx$$

$$f) \int \frac{x+3}{x^2 \sqrt{2x+3}} dx \quad g) \int \frac{3 - \sin x}{2 + \cos x} dx \quad h) \int \frac{x^4 dx}{\sqrt{(2 - x^2)^3}}$$

$$6.2.6. \quad a) \int \frac{\left(x - \frac{1}{x}\right) dx}{\sqrt{x^2 + 1}} \quad b) \int \frac{dx}{x^2 \left(x + \sqrt{1 + x^2}\right)} \quad c) \int \frac{dx}{\sqrt{\sin^3 x \cos^5 x}}$$

$$d) \int \frac{x^3 - 6x^2 + 13x - 6}{(x-2)^2(x^2 - x + 1)} dx \quad e) \int (x-1) \ln^2 x dx \quad f) \int \frac{x+1}{(x^2 + 1)^{3/2}} dx$$

$$g) \int \frac{dx}{3 - 4 \sin x + 2 \cos x} \quad h) \int \frac{x^4 dx}{(16 - x^2) \sqrt{16 - x^2}}.$$

$$6.2.7. \quad a) \int \frac{x - (\operatorname{arctg} x)^4}{1 + x^2} dx \quad b) \int \frac{(x+2)dx}{x^2 - x + 4} \quad c) \int \frac{\sin 2x dx}{\cos^4 x + \sin^4 x}$$

$$d) \int \frac{x^3 + 9x^2 + 21x + 21}{(x+3)^2(x^2 + 3)} dx \quad e) \int x^2 e^{\frac{x}{2}} dx$$

$$f) \int \frac{dx}{\sqrt[4]{5-x} + \sqrt{5-x}} \quad g) \int \frac{dx}{8 - 4 \sin x + 7 \cos x} \quad h) \int \sqrt{4 + x^2} dx$$

$$6.2.8. \quad a) \int \frac{(\arcsin x)^2 + 1}{\sqrt{1 - x^2}} dx \quad b) \int \frac{(3x-1)dx}{4x^2 - 4x + 17} \quad c) \int \frac{dx}{4 - 2 \cos^2 x}$$

$$d) \int \frac{2x^3 + 4x^2 - 2x + 3}{(x+1)^2(x^2 + 2x + 2)} dx \quad e) \int \sqrt{x} \ln^2 x dx$$

$$f) \int \frac{(\sqrt{x} + 1)^2}{x^3} dx \quad g) \int \frac{dx}{\cos x + 2 \sin x + 3} \quad h) \int x^2 \sqrt{3 - x^2} dx$$

$$6.2.9. \quad a) \int \frac{dx}{x\sqrt{x^2+1}} \quad b) \int \frac{(3-4x)dx}{\sqrt{2x^2-3x+1}} \quad c) \int \frac{dx}{\sin^5 x \cos^5 x}$$

$$d) \int \frac{x^3+4x^2+4x+2}{(x+1)^2(x^2+x+1)} dx \quad e) \int x^2 \sin 2x dx \quad f) \int \frac{1-\sqrt[3]{2x}}{\sqrt{2x}} dx$$

$$g) \int \frac{dx}{\sin x(2+\cos x)} \quad h) \int x^3 \sqrt{25-x^2} dx$$

$$6.2.10. \quad a) \int \frac{dx}{x\sqrt{x^2-1}} \quad b) \int \frac{(2+5x)dx}{\sqrt{4x^2+9x+1}} \quad c) \int \frac{dx}{\sin^4 x \cos^4 x}$$

$$d) \int \frac{-3x^3+13x^2-13x+1}{(x-2)^2(x^2-x+1)} dx \quad e) \int x^2 \arccos x dx \quad f) \int \frac{(3-4x)dx}{(1-2\sqrt{x})^2}$$

$$g) \int \frac{\sin x dx}{\sin x+2\cos x} \quad h) \int \frac{dx}{\sqrt{(64-x^2)^3}}$$

$$6.2.11. \quad a) \int \frac{xdx}{x^4+x^2+1} \quad b) \int \frac{(8+x)dx}{3x^2+11x-2} \quad c) \int \frac{\sin^4 x dx}{\cos^6 x}$$

$$d) \int \frac{x^3+2x^2+10x}{(x+3)^2(x^2-x+1)} dx \quad e) \int \frac{\arcsin x}{x^2} dx$$

$$f) \int \frac{dx}{\left(\sqrt[3]{x^2}+\sqrt[3]{x}\right)^2} \quad g) \int \frac{1+\operatorname{tg} x}{1-\operatorname{tg} x} dx \quad h) \int \frac{dx}{\sqrt{(1+x^2)^3}}$$

$$6.2.12. \quad a) \int \frac{(x^2+1)dx}{(x^3+3x+2)^2} \quad b) \int \frac{x^2 dx}{\sqrt{2x^2-x+1}} \quad c) \int \frac{\cos^6 x dx}{\sin^4 x}$$

$$d) \int \frac{3x^3+x+46}{(x-1)^2(x^2+9)} dx \quad e) \int x \ln \frac{1+x}{1-x} dx \quad f) \int \frac{\sqrt{2x+1}}{x^2} dx$$

$$g) \int \frac{dx}{3\sin^2 x+5\cos^2 x} \quad h) \int \frac{x^4 dx}{\sqrt{(6-x^2)^3}}$$

$$6.2.13. \quad a) \int \frac{x + \cos x}{x^2 + 2 \sin x} dx \quad b) \int \frac{(2x^2 - 1)dx}{\sqrt{x^2 - 4x + 8}} \quad c) \int \frac{dx}{\sin x \cos^4 x}$$

$$d) \int \frac{2x^3 + 3x^2 + 3x + 2}{(x^2 + 1)(x^2 + x + 1)} dx \quad e) \int \operatorname{arctg} \sqrt{x} dx \quad f) \int \frac{dx}{x^2 \sqrt{x-1}}$$

$$g) \int \frac{dx}{4 - 3 \cos^2 x + 5 \sin^2 x} \quad h) \int x \sqrt{4 - x^2} dx$$

$$6.2.14. \quad a) \int \frac{(x^2 + 1)dx}{\sqrt{x^3 + 3x + 1}} \quad b) \int \frac{3x^3 dx}{\sqrt{x^2 + 4x + 5}} \quad c) \int \sin^5 x \sqrt[3]{\cos x} dx$$

$$d) \int \frac{x^2 + x + 3}{(x^2 - 1)(x^2 + 1)} dx \quad e) \int x^2 \operatorname{sh} x dx \quad f) \int \frac{xdx}{x - \sqrt{x^2 - 1}}$$

$$g) \int \frac{\sin x - \cos x}{\sin x + \cos x} dx \quad h) \int x^2 \sqrt{1 + x^2} dx$$

$$6.2.15. \quad a) \int \operatorname{tg} x \cdot \ln \cos x dx \quad b) \int \frac{(3x^2 - 5)dx}{\sqrt{5 - 2x - x^2}} \quad c) \int \sin^5 x dx$$

$$d) \int \frac{x + 4}{(x^2 + 4)(x^2 + x + 1)} dx \quad e) \int \frac{\ln^2 x}{x^2} dx \quad f) \int \sqrt{\frac{x}{2 - x}} dx$$

$$g) \int \frac{dx}{1 + 3 \cos^2 x} \quad h) \int \frac{x^3 dx}{(9 + x^2)^{3/2}}$$

$$6.2.16. \quad a) \int \frac{(2 \cos x + 3 \sin x)dx}{(2 \sin x - 3 \cos x)^4} \quad b) \int \frac{dx}{(x-3)\sqrt{4x-x^2}}$$

$$c) \int \sin^3 \frac{x}{2} \cos^5 \frac{x}{2} dx \quad d) \int \frac{2x^3 + 2x + 1}{(x+1)^2(x^2 + 9)} dx \quad e) \int \frac{x \ln(x + \sqrt{1+x^2})}{\sqrt{1+x^2}} dx$$

$$f) \int \frac{dx}{(x-1)\sqrt{x^2 - 2x - 2}} \quad g) \int \frac{dx}{1 + 4 \cos x} \quad h) \int \frac{\sqrt{x^2 - 4}}{x^4} dx$$

$$6.2.17. \quad a) \int \frac{\left(\frac{1}{2\sqrt{x}} + 1\right) dx}{(\sqrt{x} + x)^3} \quad b) \int \frac{dx}{(x+1)^2 \sqrt{x^2 + x - 1}}$$

$$c) \int \frac{dx}{\sin^4 x} \quad d) \int \frac{x^3 + x + 4}{x^2 + 2x + 3} dx \quad e) \int \ln(x + \sqrt{1 + x^2}) dx$$

$$f) \int \frac{x^3 dx}{\sqrt[3]{x^2 + 1} - 1} \quad g) \int \frac{dx}{1 - \sin^4 x} \quad h) \int \frac{\sqrt{x^2 - 9}}{x^3} dx$$

$$6.2.18. \quad a) \int \frac{(1 - \sqrt{x}) dx}{\sqrt{x}(x+1)} \quad b) \int \frac{dx}{(x+2)^2 \sqrt{x^2 + 2x - 5}}$$

$$c) \int \frac{dx}{\cos^6 x} \quad d) \int \frac{x^2 dx}{1 - x^4} \quad e) \int \frac{\operatorname{arctg} e^x dx}{e^x}$$

$$f) \int \frac{dx}{(2x+1)(1 + \sqrt{2x+1})} \quad g) \int \frac{dx}{(1 + \cos^2 x)^2} \quad h) \int \frac{\sqrt{4 + x^2}}{x^6} dx$$

$$6.2.19. \quad a) \int \frac{1 + \ln^3 x}{x} dx \quad b) \int \frac{xdx}{\sqrt{1 - 3x^2 - 2x^4}} \quad c) \int \operatorname{ctg}^4 x dx$$

$$d) \int \frac{dx}{(x^2 + 3)(x^2 + x)} \quad e) \int \frac{\ln(\sin x) dx}{\sin^2 x} \quad f) \int \frac{dx}{\sqrt[3]{x^2 + 2\sqrt{x}}}$$

$$g) \int \frac{dx}{1 + \sin^2 x} \quad h) \int \frac{\sqrt{x^2 - 8}}{x^4} dx$$

$$6.2.20. \quad a) \int \frac{(1 - \cos x) dx}{x - \sin x} \quad b) \int \frac{(x + x^3) dx}{\sqrt{1 + x^2 - x^4}} \quad c) \int \operatorname{tg}^3 x dx$$

$$d) \int \frac{3xdx}{(x-1)(x^2 + x + 1)} \quad e) \int x(\operatorname{arctg} x)^2 dx \quad f) \int \sqrt{\frac{1-x}{1+x}} dx$$

$$g) \int \frac{6 + \cos x}{5 + 4 \sin x} dx \quad h) \int \frac{dx}{x^4 \sqrt{x^2 - 3}}$$

$$6.2.21. \quad a) \int \frac{(x \cos x + \sin x) dx}{(x \sin x)^2} \quad b) \int \frac{xdx}{\sqrt{2x^2 - 3x - 4}} \quad c) \int \cos x \cos^2 3x dx$$

$$d) \int \frac{dx}{(x+1)(x^2+1)} \quad e) \int \frac{\ln(\ln x)}{x} dx \quad f) \int \frac{1 - \sin \sqrt{x}}{\sqrt{x}} dx$$

$$g) \int \frac{dx}{(\sin x + \cos x)^2} \quad h) \int \frac{xdx}{(1-x^4)^{3/2}}$$

$$6.2.22. \quad a) \int \frac{\arccos^3 x - 1}{\sqrt{1-x^2}} dx \quad b) \int \sqrt{x^2 - 2x - 2} dx \quad c) \int \sin x \sin 2x \sin 3x dx$$

$$d) \int \frac{(x^2 - 1) dx}{(x+1)(x^2 - x + 1)} \quad e) \int \frac{xe^x}{\sqrt{1+e^x}} dx \quad f) \int \frac{\sqrt{x+1} + 1}{\sqrt{x+1} - 1} dx$$

$$g) \int \frac{dx}{\cos^2 x + 2 \sin x \cos x + 2 \sin^2 x} \quad h) \int \frac{x^5 dx}{\sqrt{x^4 + 4}}$$

$$6.2.23. \quad a) \int \frac{x^3 dx}{(x^2 + 1)^2} \quad b) \int \sqrt{1 - 4x - x^2} dx \quad c) \int \frac{\cos^3 x dx}{\sin^6 x}$$

$$d) \int \frac{dx}{(x^2 - 3)(x^2 + 2)} \quad e) \int \frac{\arcsin \sqrt{x}}{\sqrt{1-x}} dx \quad f) \int \frac{e^{2x} dx}{\sqrt{1+e^x}}$$

$$g) \int \frac{\sec^2 x dx}{\sqrt{\operatorname{tg}^2 x + 4 \operatorname{tg} x + 1}} \quad h) \int \frac{x^4 dx}{(1+x^2)^3}$$

$$6.2.24. \quad a) \int \frac{dx}{x\sqrt{4 - \ln^2 x}} \quad b) \int \frac{dx}{x^2(x - \sqrt{1+x^2})} \quad c) \int \frac{\sin^3 x dx}{\sqrt[4]{\cos^3 x}}$$

$$d) \int \frac{xdx}{(1+x)^2(1+x^2)} \quad e) \int x \cdot \operatorname{tg}^2 2x dx \quad f) \int \frac{\sqrt{x}}{x^2 \sqrt{x-1}} dx$$

$$g) \int \frac{\sin^2 x - \cos^2 x}{\sin^4 x + \cos^4 x} dx \quad h) \int \frac{\sqrt{x^2 - 1}}{x^3} dx$$

$$6.2.25. \quad a) \int \frac{dx}{e^x \sqrt{1 - e^{-2x}}} \quad b) \int \frac{(3x-5) dx}{4x^2 - 6x + 7} \quad c) \int \sin^4 x \cos^6 x dx$$

$$d) \int \frac{dx}{x^2(x^2+4)} \quad e) \int \frac{x \operatorname{arctg} x}{\sqrt{1-x^2}} dx \quad f) \int \sqrt{\frac{x+2}{x+1}} \frac{dx}{(x+2)^2}$$

$$g) \int \frac{\sin x \cos x dx}{1+\sin^4 x} \quad h) \int \frac{x^3 dx}{\sqrt{(16+x^2)^3}}$$

$$6.2.26. \quad a) \int \frac{\ln x dx}{x(1-\ln^2 x)} \quad b) \int \frac{(2x-1)dx}{6-3x-x^2} \quad c) \int \operatorname{tg}^7 x dx$$

$$d) \int \frac{xdx}{(x^2+2x+2)(x-3)^2} \quad e) \int \sqrt{1-x^2} \operatorname{arcsin} x dx$$

$$f) \int \frac{dx}{(x+1)\sqrt{1-x^2}} \quad g) \int \frac{\sin x dx}{\sin^3 x + \cos^3 x} \quad h) \int \frac{x^4 dx}{\sqrt{3-x^2}}$$

$$6.2.27. \quad a) \int \frac{\sqrt{\operatorname{tg}^3 x} dx}{\cos^4 x} \quad b) \int \frac{xdx}{5x-x^2+8} \quad c) \int \frac{dx}{\sqrt[3]{\cos x \sin^{11} x}}$$

$$d) \int \frac{(x^2-2)dx}{x^4-1} \quad e) \int \frac{x \operatorname{arctg} x}{(1+x^2)^2} dx \quad f) \int \sqrt{\frac{1+x}{x}} \frac{dx}{x^2}$$

$$g) \int \frac{dx}{(\sin x - 3 \cos x)^2} \quad h) \int \frac{dx}{(1-x^2)\sqrt{1-x^2}}$$

$$6.2.28. \quad a) \int \frac{(3x-1)dx}{x^2+9} \quad b) \int \frac{(3-2x)dx}{x^2-6x+1} \quad c) \int \frac{sh^3 x dx}{ch^2 x}$$

$$d) \int \frac{(x^3+4x^2-2x+1)dx}{x^4+x} \quad e) \int \frac{\ln(x+1)dx}{\sqrt{x+1}} \quad f) \int \frac{1+\sqrt[4]{x}}{x+\sqrt{x}} dx$$

$$g) \int \frac{\cos x dx}{\sin^3 x - \cos^3 x} \quad h) \int \frac{\sqrt{9-x^2}}{x^2} dx$$

$$6.2.29. \quad a) \int \frac{(x-x^3)dx}{\sqrt{1+x^4}} \quad b) \int \frac{(2-x)dx}{14-3x+x^2} \quad c) \int \frac{dx}{shx \cdot ch^4 x}$$

$$d) \int \frac{x^2 dx}{x^4+5x^2+4} \quad e) \int x^3 \operatorname{arcsin} \frac{1}{x} dx \quad f) \int \frac{dx}{e^x \sqrt{e^x+1}}$$

$$g) \int \frac{dx}{1-\sin^4 x} \quad h) \int \frac{\sqrt{x^2-4}}{x^2} dx$$

$$6.2.30. a) \int \frac{2x - \sqrt{\arcsin x}}{\sqrt{1-x^2}} dx$$

$$d) \int \frac{2x^5 + 6x^3 + 1}{x^4 + 3x^2} dx$$

$$g) \int \frac{tgx dx}{tg^2 x + tgx + 1}$$

$$b) \int \frac{xdx}{x + \sqrt{x^2 - 1}}$$

$$c) \int \frac{dx}{\sin^6 x}$$

$$e) \int x^2 \ln \sqrt{1-x} dx \quad f) \int \frac{x^3 dx}{1 + \sqrt[3]{x^4 + 1}}$$

$$h) \int \frac{\sqrt{x^2 + 1}}{x} dx$$