1

$$\int x(x+1)(x-2)dx = \int x(x^2-x-2)dx = \int (x^3-x^2-2x)dx = \frac{x^4}{4} - \frac{x^3}{3} - x^2 + C$$

2

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

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

3

$$\int \sqrt{x\sqrt{x\sqrt{x}}}dx = \int x^{\frac{7}{8}}dx = \frac{8}{15}x^{\frac{15}{8}} + C$$

4

$$\int \frac{dx}{7+x^2} = \frac{1}{\sqrt{7}}\arctan\frac{x}{\sqrt{7}} + C$$

5

$$\int \frac{dx}{2x^2+3} = \frac{1}{2}\int \frac{dx}{x^2+\frac{3}{2}} = \frac{1}{2}\sqrt{\frac{2}{3}}\arctan\left(\sqrt{\frac{2}{3}}x\right) + C$$

6

$$\int \frac{dx}{3x^2-7} = -\frac{1}{3}\int \frac{dx}{\frac{7}{3}-x^2} = -\frac{1}{3}\frac{1}{2\sqrt{\frac{7}{3}}}\ln\left|\frac{\sqrt{\frac{7}{3}}+x}{\sqrt{\frac{7}{3}}-x}\right| + C$$

7

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

8

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

$$= -\frac{1}{4} \ln \left| \frac{1 + x}{1 - x} \right| - \frac{1}{2} \arctan x + C$$

9

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

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

$$= \frac{1}{2} \ln |1 + x^2| + 2 \arctan x + \ln |x| - \frac{1}{2} \ln |1 + x^2| + C = 2 \arctan x + \ln |x| + C$$

10

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

11

$$\int (5^x - 2^x)^2 dx = \int (5^{2x} - 2 * 10^x + 4^x) dx = \int 25^x dx - 2 \int 10^x dx + \int 4^x dx =$$

$$= \frac{25^x}{\ln 25} - \frac{2 * 10^x}{\ln 10} + \frac{4^x}{\ln 4} + C$$

12

$$\int \frac{2^x 3^{2x} 4^{3x}}{5^x 6^{2x}} dx = \int \left(\frac{32}{5} \right)^x dx = \left(\frac{32}{5} \right)^x \frac{1}{\ln \left(\frac{32}{5} \right)} + C$$

13

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

14

$$\int \sin \frac{x}{2}^2 dx = \int \frac{1 - \cos x}{2} dx = \frac{1}{2} \int dx - \frac{1}{2} \int \cos x dx = \frac{x - \sin x}{2} + C$$