

Домашня робота 4

$$3.15 \quad \int \frac{2x+3}{(x-2)(x+5)} dx = \frac{2}{7} \int \frac{dx}{x-2} + \frac{5}{7} \int \frac{dx}{x+5} = \frac{2}{7} \ln |x-2| + \frac{5}{7} \ln |x+5| + c$$

$$3.16 \quad \int \frac{x^3+1}{x^3-5x^2+6x} dx = \frac{1}{6} \int \frac{dx}{x} - \frac{9}{2} \int \frac{dx}{x-2} + \frac{28}{3} \int \frac{dx}{x-3} = \frac{1}{6} \ln |x| - \frac{9}{2} \ln |x-2| + \frac{28}{3} \ln |x-3| + c$$

$$\begin{aligned} 3.17 \quad \int \frac{dx}{(x+1)(x^2+1)} &= \frac{1}{2} \int \frac{dx}{x+1} - \frac{1}{2} \int \frac{x-1}{x^2+1} dx = \\ &= \frac{1}{2} \left(\ln |x+1| - \int \frac{x}{x^2+1} dx \Big|_{u=x^2+1} \frac{dx}{2x} + \int \frac{dx}{x^2+1} \right) = \\ &= \frac{1}{2} \left(\ln |x+1| + \frac{1}{2} \ln |x^2+1| + \arctan x \right) + c \end{aligned}$$

$$\begin{aligned} 3.18 \quad \int \frac{dx}{x(x+1)(x^2+x+1)} &= \int \frac{dx}{x} - \int \frac{dx}{x+1} - \int \frac{dx}{x^2+x+1} = \ln |x| - \ln |x+1| - \\ &- \int \frac{dx}{(x+0.5)^2+0.75} \Big|_{u=\frac{2x+1}{\sqrt{3}}} = \ln |x| - \ln |x+1| - \frac{2}{\sqrt{3}} \ln \left| \frac{2x+1}{\sqrt{3}} \right| + c \end{aligned}$$