<u>Exercises 1c</u> – integrals of rational functions

Find the integral $\displaystyle\int \frac{3x\,\mathrm{d}x}{2x^2+5x+2}$. $\qquad\left[2\ln|x+2| - \frac{1}{2}\ln|2x+1| + c\,.\right]$

Find the integral $\displaystyle\int \frac{(4x+9)\,\mathrm{d}x}{2x^2-5x-3}$. $\qquad\left[3\ln|x-3| - \ln|2x+1| + c\,.\right]$

Find the integral $\displaystyle\int \frac{(5-x)\,\mathrm{d}x}{3x^2+5x-2}$. $\qquad\left[\frac{2}{3}\ln|3x-1| - \ln|x+2| + c\,.\right]$

Find the integral $\displaystyle\int \frac{(x-4)\,\mathrm{d}x}{6x^2+x-2}$. $\qquad\left[\frac{2}{3}\ln|3x+2| - \frac{1}{2}\ln|2x-1| + c\,.\right]$

Find the integral $\displaystyle\int \frac{7(x+1)\,\mathrm{d}x}{3-5x-2x^2}$. $\qquad\left[-2\ln|x+3| - \frac{3}{2}\ln|1-2x| + c\,.\right]$

Find the integral $\displaystyle\int \frac{(7x+3)\,\mathrm{d}x}{3x^2-10x+3}$. $\qquad\left[3\ln|x-3| - \frac{2}{3}\ln|3x-1| + c\,.\right]$

Find the integral $\displaystyle\int \frac{(x-3)\,\mathrm{d}x}{6x^2-x-1}$. $\qquad\left[\frac{2}{3}\ln|3x+1| - \frac{1}{2}\ln|2x-1| + c\,.\right]$

Find the integral $\displaystyle\int \frac{(x+6)\,\mathrm{d}x}{4x^2-x-3}$. $\qquad\left[\ln|x-1| - \frac{3}{4}\ln|4x+3| + c\,.\right]$

Find the integral $\displaystyle\int \frac{(x+15)\,\mathrm{d}x}{9+3x-2x^2}$. $\qquad\left[\frac{3}{2}\ln|2x+3| - 2\ln|x-3| + c\,.\right]$

Find the integral $\displaystyle\int \frac{(2x-7)\,\mathrm{d}x}{4x^2+5x-6}$. $\qquad\left[\ln|x+2| - \frac{1}{2}\ln|4x-3| + c\,.\right]$

Find the integral $\displaystyle\int \frac{2\,\mathrm{d}x}{4x^2-8x+3}$. $\qquad\left[\frac{1}{2}\ln\left|\frac{2x-3}{2x-1}\right| + c\,.\right]$

Find the integral $\displaystyle\int \frac{\mathrm{d}x}{6x^2+7x+2}$. $\qquad\left[\ln\left|\frac{2x+1}{3x+2}\right| + c\,.\right]$

Find the integral $\displaystyle\int \frac{5\,\mathrm{d}x}{6x^2-13x+6}$. $\qquad\left[\ln\left|\frac{2x-3}{3x-2}\right| + c\,.\right]$

Find the integral $\displaystyle\int \frac{7\,\mathrm{d}x}{6+x-2x^2}$. $\qquad\left[\ln\left|\frac{2x+3}{x-2}\right| + c\,.\right]$

Find the integral $\displaystyle\int \frac{(13-6x)\,\mathrm{d}x}{3-7x-6x^2}$. $\qquad\left[2\ln|2x+3| - \ln|3x-1| + c\,.\right]$

Find the integral $\displaystyle\int \frac{x(x+2)\,\mathrm{d}x}{(x+1)^3}$. $\qquad\left[\ln|x+1| + \frac{1}{2(x+1)^2} + c\,.\right]$

Find the integral $\displaystyle\int \frac{x^2\,\mathrm{d}x}{(x-2)^3}$. $\qquad\left[\ln|x-2| - \frac{4}{x-2} - \frac{2}{(x-2)^2} + c\,.\right]$

Find the integral $\displaystyle\int \frac{x\,\mathrm{d}x}{(2x+3)^3}$. $\qquad\left[-\frac{1}{4(2x+3)} + \frac{3}{8(2x+3)^2} + c\,.\right]$

Find the integral $\displaystyle\int \frac{(x^2 - x + 1)\,\mathrm{d}x}{(x+1)^2}$.

$\left[x - 3\ln|x+1| - \dfrac{3}{x+1} + c. \right]$

Find the integral $\displaystyle\int \frac{(x^2 + 1)\,\mathrm{d}x}{(x-1)^3}$.

$\left[\ln|x-1| - \dfrac{2}{x-1} - \dfrac{1}{(x-1)^2} + c. \right]$

Find the integral $\displaystyle\int \frac{(4x^2 + 7)\,\mathrm{d}x}{(2x+1)^3}$.

$\left[\frac{1}{2}\ln|2x+1| + \dfrac{1}{2x+1} - \dfrac{2}{(2x+1)^2} + c. \right]$

Find the integral $\displaystyle\int \frac{x^3\,\mathrm{d}x}{(x-1)^2}$.

$\left[\frac{1}{2}x^2 + 2x + 3\ln|x-1| - \dfrac{1}{x-1} + c. \right]$

Find the integral $\displaystyle\int \frac{(4x^3 + 3)\,\mathrm{d}x}{(1-2x)^2}$.

$\left[\frac{1}{2}(x+1)^2 + \frac{3}{4}\ln|2x-1| - \dfrac{7}{4(2x-1)} + c. \right]$