ALA 07 (HA) zum 06.06.2013

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5. Juni 2013

1. (i)

$$\frac{x+1}{x^2-x-6} = \frac{A}{x+2} + \frac{B}{x-3} = \frac{(A+B)x + (2B-3A)}{(x+2)(x-3)}$$

$$\begin{array}{rrcl} \Rightarrow & A+B & = & 1 \\ & 2B-3A & = & 1 \end{array} \qquad \begin{array}{rrcl} \Rightarrow & A & = & 1-B \\ & 4 & = & 5B \end{array} \qquad \begin{array}{rrcl} \Rightarrow & A & = & 1/5 \\ & B & = & 4/5 \end{array}$$

$$\int \frac{x+1}{x^2-x-6}\,\mathrm{d}x = \int \frac{1}{5(x+2)} + \frac{4}{5(x-3)}\,\mathrm{d}x = \frac{1}{5}\ln|x+2| + \frac{4}{5}\ln|x-3|$$

Probe:

$\frac{1}{5}\ln|x+2| + \frac{4}{5}\ln|x-3| = \frac{1}{5}\cdot\frac{1}{x+2} + \frac{4}{5}\cdot\frac{1}{x-3} = \frac{(x-3)+4(x+2)}{5(x+2)(x-3)} = \frac{x+1}{(x+2)(x-3)}$ □

(ii)

(iii)

2. (a)

(b)

(c)

3. (i)

(ii)

(iii)

4. (a)

(b)

(c)

(d)

(e)

5. (a)

(b)

(c)

(d)