$$\begin{array}{c|cccc} & 1 & -8 & 25 & -26 \\ \hline 2 & 1 & -6 & 13 & 0 \end{array} = 2 * 1 = 2\,;\ -8 + 2 = -6; 2 * -6 = -12; 25 + (-12) = 13; 13 * 2 = 26; -26 + 26 = 0$$

$$\int \frac{x^4 - 10x^3 + 12x^2 - 4}{x^3 - 8x^2 + 25x - 26} dx$$

$$\begin{array}{r|l} x^4 - 10x^3 + 12x^2 - 4 & x^3 - 8x^2 + 25x - 26 \\ \hline -x^4 + 8x^3 - 25x^2 + 26x & x - 2 \\ \hline -2x^3 - 13x^2 + 26x - 4 & \\ -2x^3 + 16x^2 - 50x + 52 & \\ \hline -29x^2 + 76x - 56 & \end{array}$$

$$I = \int \left(x - 2 + \frac{-29x^2 + 76x - 56}{x^3 - 8x^2 + 25x - 26} \right) dx =$$

$$= \int (x - 2)\, dx - \int \frac{29x^2 + 76x - 56}{x^3 - 8x^2 + 25x - 26} dx\,.$$

$$I_1 = \int \frac{29x^2 + 76x - 56}{x^3 - 8x^2 + 25x - 26} =$$

$$I_1 = \int \frac{29x^2 + 76x - 56}{(x - 2)(x^2 - 6x + 13)} dx\,.$$

$$\frac{29x^2 + 76x - 56}{(x - 2)(x^2 - 6x + 13)} = \frac{A}{x - 2} + \frac{Bx + C}{x^2 - 6x + 13}.$$

$$29x^2 + 76x - 56 = A(x^2 - 6x + 13) + (Bx + C)(x - 2)$$

$$x = 2, 29 * 2^2 - 76 * 2 + 56 = A(2^2 - 6.2 + 13) \Longrightarrow 5A = 20 \Longrightarrow A = 4$$

$$29x^2 - 76x + 56 = 4(x^2 - 6x + 13) + (Bx + C)(x - 2)$$

$$x = 0, 56 = 4.13 + C\,.(-2) \Longrightarrow -2C = 56 - 52 \Longrightarrow C = -2$$

$$29x^2 - 76x + 56 = 4(x^2 - 6x + 13) + (Bx - 2)(x - 2)$$

$$x = 1, 29 - 76 + 56 = 4(1 - 6 + 13) + (B - 2)(-1), 2 - B + 4.8 = 9 \Longrightarrow B = 25$$

$$I_1 = \int \frac{4}{x - 2} dx + \int \frac{25x - 2}{x^2 - 6x + 13}$$

$$I_2 = \int \frac{25x - 2}{x^2 - 6x + 13}$$

$$x^2 - 6x + 13 = x^2 - 2 * x * 3 + 3^2 + 2^2 = (x - 3)^2 + 2^2$$

$$t = x - 3, x = t + 3, dx = dt$$

$$I_2 = \int \frac{25x - 2}{(x - 3)^2 + 2^2} dx = \int \frac{25t + 73}{t^2 + 2^2} dt =$$

$$= 25 \int \frac{t}{t^2 + 2^2} dt + 73 \int \frac{dt}{t^2 + 2^2} =$$

$$\frac{25}{2} \int \frac{d(t^2 + 4)}{t^2 + 4} + \frac{73}{2} arctg \frac{t}{2} = \frac{25}{2} \ln(t^2 + 4) + \frac{73}{2} arctg \frac{t}{2} + C =$$

$$\frac{25}{2} \ln((x - 3)^2 + 4) + \frac{73}{2} arctg \frac{x - 3}{2} + C =$$

$$= \frac{25}{2} \ln(x^2 - 6x + 13) + \frac{73}{2} arctg \frac{x - 3}{2} + C =$$

$$I_1 = 4 \int \frac{d(x - 2)}{x - 2} + I_2 = 4 \ln|x - 2| + \frac{25}{2} \ln(x^2 - 6x + 13) + \frac{73}{2} arctg \frac{x - 3}{2} + C.$$

$$I = \int (x - 2) d(x - 2) - I_1 = \frac{(x - 2)^2}{2} - 4 \ln|x - 2| - \frac{25}{2} \ln(x^2 - 6x + 13) - \frac{73}{2} arctg \frac{x - 3}{2} - C$$