

```
> restart;alias(sigma=sigma(x),phi=phi(x),psi=psi(z)):with
(PDEtools):with(plots):with(LinearAlgebra):with(linalg):
> S6:=diff(sigma,x)*(x*(x-1)*diff(sigma,x,x))^2+(diff(sigma,x)*(2*
sigma-(2*x-1)*diff(sigma,x))+nu[1]*nu[2]*nu[3]*nu[4])^2-product
(diff(sigma,x)+nu[k]^2,k=1..4);
```

$$S6 := \left(\frac{\partial}{\partial x} \sigma \right) x^2 (x-1)^2 \left(\frac{\partial^2}{\partial x^2} \sigma \right)^2 + \left(\left(\frac{\partial}{\partial x} \sigma \right) \left(2\sigma - (2x-1) \left(\frac{\partial}{\partial x} \sigma \right) \right) \right. \\ \left. + v_1 v_2 v_3 v_4 \right)^2 - \left(\frac{\partial}{\partial x} \sigma + v_1^2 \right) \left(\frac{\partial}{\partial x} \sigma + v_2^2 \right) \left(\frac{\partial}{\partial x} \sigma + v_3^2 \right) \left(\frac{\partial}{\partial x} \sigma + v_4^2 \right) \quad (1)$$

```
> #a:=-2;b:=10;c:=3;n:=2;
> #nu[1] := 1/2-n-(1/2)*b+(1/2)*a;nu[2] := -1/2+c-(1/2)*b-(1/2)*a;
nu[3] := 1/2+(1/2)*a-(1/2)*b;nu[4] := 1/2-(1/2)*a-(1/2)*b;
> nu[1]:=-(a+1-b-2*(n+1))/2;nu[2]:=(2*c-1-a-b)/2;nu[3]:=-(1+a-b)/2;
nu[4]:=(1-a-b)/2;
```

$$v_1 := -\frac{1}{2}a + \frac{1}{2} + \frac{1}{2}b + n \\ v_2 := c - \frac{1}{2} - \frac{1}{2}a - \frac{1}{2}b \\ v_3 := -\frac{1}{2} - \frac{1}{2}a + \frac{1}{2}b \\ v_4 := \frac{1}{2} - \frac{1}{2}a - \frac{1}{2}b \quad (2)$$

```
> sigma:=A*x+B+C/x;
```

$$\sigma := Ax + B + \frac{C}{x} \quad (3)$$

```
> N:=4;
```

$$N := 4 \quad (4)$$

```
> collect(expand(S6),[diff,x],factor);solve([op(1,%),op(2,%),op(3,
%)],[A,B,C]):factor(op(1,%[N]));convert(4*factor(op(2,%%[N])),
parfrac,b);factor(op(3,%%[N]));
```

$$\frac{1}{16} A (-a^6 + 3a^5c + 3a^5n + a^4b^2 - a^4bc + a^4bn - 3a^4c^2 - 8a^4cn - 3a^4n^2 - 2a^3b^2c \\ - 2a^3b^2n + 4a^3bc^2 - 4a^3bn^2 + 8a^3c^2n + 8a^3cn^2 + a^2b^4 - 2a^2b^3c + 2a^2b^3n \\ - 2a^2b^2c^2 - 2a^2b^2n^2 - 8a^2bc^2n + 8a^2bcn^2 - 8a^2c^2n^2 - ab^4c - ab^4n + 4ab^3c^2 \\ - 4ab^3n^2 + 8ab^2c^2n + 8ab^2cn^2 - b^6 + 3b^5c - 3b^5n - 3b^4c^2 + 8b^4cn - 3b^4n^2 \\ - 8b^3c^2n + 8b^3cn^2 - 8b^2c^2n^2 - 4Aa^4 + 8Aa^3c + 8Aa^3n - 8Aa^2b^2 + 8Aa^2bc \\ - 8Aa^2bn - 12Aa^2c^2 - 8Aa^2cn - 12Aa^2n^2 + 8Aab^2c + 8Aab^2n + 8Aab^2c^2 \\ - 8Aab^2n^2 + 16Aac^2n + 16Aacn^2 - 4Ab^4 + 8Ab^3c - 8Ab^3n - 12Ab^2c^2 \\ + 8Ab^2cn - 12Ab^2n^2 - 16Ab^2cn + 16Ab^2cn^2 - 16Ac^2n^2 + 4Ba^4 - 8Ba^3c \\ - 8Ba^3n - 8Ba^2b^2 + 8Ba^2bc - 8Ba^2bn + 16Ba^2cn + 8Ba^2c^2 + 8Ba^2b^2n \\ + 4Bb^4 - 8Bb^3c + 8Bb^3n - 16Bb^2cn - a^4c + a^4n - 4a^3bc - 4a^3bn + 4a^3c^2 \\ - 4a^3n^2 + 10a^2b^2c - 10a^2b^2n - 4a^2bc^2 + 32a^2bcn - 4a^2bn^2 - 8a^2c^2n \\ + 8a^2cn^2 - 4ab^3c - 4ab^3n - 4ab^2c^2 + 4ab^2n^2 - 16ab^2cn - 16ab^2cn^2 - b^4c$$

$$\begin{aligned}
& + b^4 n + 4 b^3 c^2 + 4 b^3 n^2 + 8 b^2 c^2 n - 8 b^2 c n^2 + 16 b c^2 n^2 - 16 A^2 a^2 + 16 A^2 a c \\
& + 16 A^2 a n - 16 A^2 b^2 + 16 A^2 b c - 16 A^2 b n - 16 A^2 c^2 - 16 A^2 n^2 + 8 A a^2 c - 8 A a^2 n \\
& - 32 A a b c - 32 A a b n + 8 A a c^2 - 8 A a n^2 + 8 A b^2 c - 8 A b^2 n + 8 A b c^2 \\
& + 48 A b c n + 8 A b n^2 - 16 A c^2 n + 16 A c n^2 + 8 B a^2 c - 8 B a^2 n - 16 B a b c \\
& - 16 B a b n + 8 B b^2 c - 8 B b^2 n + 32 B b c n + a^4 - 2 a^3 c - 2 a^3 n - 10 a^2 b^2 \\
& + 10 a^2 b c - 10 a^2 b n - 2 a^2 c^2 - 2 a^2 n^2 + 10 a b^2 c + 10 a b^2 n - 4 a b c^2 + 4 a b n^2 \\
& + 8 a c^2 n + 8 a c n^2 + b^4 - 2 b^3 c + 2 b^3 n - 2 b^2 c^2 - 16 b^2 c n - 2 b^2 n^2 + 8 b c^2 n \\
& - 8 b c n^2 - 8 c^2 n^2 + 64 A^2 B + 16 A^2 c - 16 A^2 n + 64 A B^2 - 8 A a^2 + 8 A a c + 8 A a n \\
& - 8 A b^2 + 8 A b c - 8 A b n - 12 A c^2 + 8 A c n - 12 A n^2 - 8 B a^2 + 8 B a c + 8 B a n \\
& - 8 B b^2 + 8 B b c - 8 B b n - 16 B c n - 2 a^2 c + 2 a^2 n - 4 a b c - 4 a b n + 4 a c^2 \\
& - 4 a n^2 - 2 b^2 c + 2 b^2 n + 4 b c^2 + 4 b n^2 - 8 c^2 n + 8 c n^2 - 16 A^2 + 8 A c - 8 A n \\
& - 8 B c + 8 B n + a^2 - a c - a n + b^2 - b c + b n - 3 c^2 + 8 c n - 3 n^2 - 4 A + 4 B + 3 c \\
& - 3 n - 1) + \frac{1}{2} \frac{1}{x} (A C (a^4 - 2 a^3 c - 2 a^3 n - 2 a^2 b^2 + 2 a^2 b c - 2 a^2 b n \\
& + 4 a^2 c n + 2 a b^2 c + 2 a b^2 n + b^4 - 2 b^3 c + 2 b^3 n - 4 b^2 c n + 2 a^2 c - 2 a^2 n \\
& - 4 a b c - 4 a b n + 2 b^2 c - 2 b^2 n + 8 b c n + 16 A^2 + 32 A B - 2 a^2 + 2 a c + 2 a n \\
& - 2 b^2 + 2 b c - 2 b n - 4 c n - 2 c + 2 n + 1)) - \frac{1}{16} \frac{1}{x^2} (C (-a^6 + 3 a^5 c + 3 a^5 n \\
& + a^4 b^2 - a^4 b c + a^4 b n - 3 a^4 c^2 - 8 a^4 c n - 3 a^4 n^2 - 2 a^3 b^2 c - 2 a^3 b^2 n + 4 a^3 b c^2 \\
& - 4 a^3 b n^2 + 8 a^3 c^2 n + 8 a^3 c n^2 + a^2 b^4 - 2 a^2 b^3 c + 2 a^2 b^3 n - 2 a^2 b^2 c^2 - 2 a^2 b^2 n^2 \\
& - 8 a^2 b c^2 n + 8 a^2 b c n^2 - 8 a^2 c^2 n^2 - a b^4 c - a b^4 n + 4 a b^3 c^2 - 4 a b^3 n^2 \\
& + 8 a b^2 c^2 n + 8 a b^2 c n^2 - b^6 + 3 b^5 c - 3 b^5 n - 3 b^4 c^2 + 8 b^4 c n - 3 b^4 n^2 - 8 b^3 c^2 n \\
& + 8 b^3 c n^2 - 8 b^2 c^2 n^2 - 8 A a^4 + 16 A a^3 c + 16 A a^3 n - 16 A a^2 b^2 + 16 A a^2 b c \\
& - 16 A a^2 b n - 24 A a^2 c^2 - 16 A a^2 c n - 24 A a^2 n^2 + 16 A a b^2 c + 16 A a b^2 n \\
& + 16 A a b c^2 - 16 A a b n^2 + 32 A a c^2 n + 32 A a c n^2 - 8 A b^4 + 16 A b^3 c - 16 A b^3 n \\
& - 24 A b^2 c^2 + 16 A b^2 c n - 24 A b^2 n^2 - 32 A b c^2 n + 32 A b c n^2 - 32 A c^2 n^2 + 4 B a^4 \\
& - 8 B a^3 c - 8 B a^3 n - 8 B a^2 b^2 + 8 B a^2 b c - 8 B a^2 b n + 16 B a^2 c n + 8 B a b^2 c \\
& + 8 B a b^2 n + 4 B b^4 - 8 B b^3 c + 8 B b^3 n - 16 B b^2 c n - a^4 c + a^4 n - 4 a^3 b c \\
& - 4 a^3 b n + 4 a^3 c^2 - 4 a^3 n^2 + 10 a^2 b^2 c - 10 a^2 b^2 n - 4 a^2 b c^2 + 32 a^2 b c n - 4 a^2 b n^2 \\
& - 8 a^2 c^2 n + 8 a^2 c n^2 - 4 a b^3 c - 4 a b^3 n - 4 a b^2 c^2 + 4 a b^2 n^2 - 16 a b c^2 n \\
& - 16 a b c n^2 - b^4 c + b^4 n + 4 b^3 c^2 + 4 b^3 n^2 + 8 b^2 c^2 n - 8 b^2 c n^2 + 16 b c^2 n^2 \\
& - 48 A^2 a^2 + 48 A^2 a c + 48 A^2 a n - 48 A^2 b^2 + 48 A^2 b c - 48 A^2 b n - 48 A^2 c^2 \\
& - 48 A^2 n^2 + 16 A a^2 c - 16 A a^2 n - 64 A a b c - 64 A a b n + 16 A a c^2 - 16 A a n^2 \\
& + 16 A b^2 c - 16 A b^2 n + 16 A b c^2 + 96 A b c n + 16 A b n^2 - 32 A c^2 n + 32 A c n^2 \\
& + 8 B a^2 c - 8 B a^2 n - 16 B a b c - 16 B a b n + 8 B b^2 c - 8 B b^2 n + 32 B b c n + a^4 \\
& - 2 a^3 c - 2 a^3 n - 10 a^2 b^2 + 10 a^2 b c - 10 a^2 b n - 2 a^2 c^2 - 2 a^2 n^2 + 10 a b^2 c
\end{aligned}$$

$$\begin{aligned}
& + 10 a b^2 n - 4 a b c^2 + 4 a b n^2 + 8 a c^2 n + 8 a c n^2 + b^4 - 2 b^3 c + 2 b^3 n - 2 b^2 c^2 \\
& - 16 b^2 c n - 2 b^2 n^2 + 8 b c^2 n - 8 b c n^2 - 8 c^2 n^2 + 192 A^2 B - 256 A^2 C + 48 A^2 c \\
& - 48 A^2 n + 128 A B^2 - 16 A a^2 + 16 A a c + 16 A a n - 16 A b^2 + 16 A b c - 16 A b n \\
& - 24 A c^2 + 16 A c n - 24 A n^2 - 8 B a^2 + 8 B a c + 8 B a n - 8 B b^2 + 8 B b c - 8 B b n \\
& - 16 B c n - 2 a^2 c + 2 a^2 n - 4 a b c - 4 a b n + 4 a c^2 - 4 a n^2 - 2 b^2 c + 2 b^2 n + 4 b c^2 \\
& + 4 b n^2 - 8 c^2 n + 8 c n^2 - 48 A^2 - 64 A C + 16 A c - 16 A n - 8 B c + 8 B n + a^2 - a c \\
& - a n + b^2 - b c + b n - 3 c^2 + 8 c n - 3 n^2 - 8 A + 4 B + 3 c - 3 n - 1)) \\
& - \frac{1}{2} \frac{1}{x^3} (C^2 (a^4 - 2 a^3 c - 2 a^3 n - 2 a^2 b^2 + 2 a^2 b c - 2 a^2 b n + 4 a^2 c n + 2 a b^2 c \\
& + 2 a b^2 n + b^4 - 2 b^3 c + 2 b^3 n - 4 b^2 c n + 2 a^2 c - 2 a^2 n - 4 a b c - 4 a b n + 2 b^2 c \\
& - 2 b^2 n + 8 b c n + 48 A^2 + 64 A B - 2 a^2 + 2 a c + 2 a n - 2 b^2 + 2 b c - 2 b n - 4 c n \\
& + 16 A - 2 c + 2 n + 1)) + \frac{1}{4} \frac{1}{x^4} (C^2 (-a^4 + 2 a^3 c + 2 a^3 n - 2 a^2 b^2 + 2 a^2 b c \\
& - 2 a^2 b n - 3 a^2 c^2 - 2 a^2 c n - 3 a^2 n^2 + 2 a b^2 c + 2 a b^2 n + 2 a b c^2 - 2 a b n^2 \\
& + 4 a c^2 n + 4 a c n^2 - b^4 + 2 b^3 c - 2 b^3 n - 3 b^2 c^2 + 2 b^2 c n - 3 b^2 n^2 - 4 b c^2 n \\
& + 4 b c n^2 - 4 c^2 n^2 - 12 A a^2 + 12 A a c + 12 A a n - 12 A b^2 + 12 A b c - 12 A b n \\
& - 12 A c^2 - 12 A n^2 + 2 a^2 c - 2 a^2 n - 8 a b c - 8 a b n + 2 a c^2 - 2 a n^2 + 2 b^2 c \\
& - 2 b^2 n + 2 b c^2 + 12 b c n + 2 b n^2 - 4 c^2 n + 4 c n^2 + 48 A B - 128 A C + 12 A c \\
& - 12 A n + 16 B^2 - 2 a^2 + 2 a c + 2 a n - 2 b^2 + 2 b c - 2 b n - 3 c^2 + 2 c n - 3 n^2 + 4 A \\
& - 16 C + 2 c - 2 n - 1)) + \frac{8 C^3 (3 A + 2 B + 1)}{x^5} \\
& - \frac{C^3 (-a^2 + a c + a n - b^2 + b c - b n - c^2 - n^2 + 4 B - 16 C + c - n + 3)}{x^6} - \frac{8 C^4}{x^7}
\end{aligned}$$

$$A = -\frac{1}{4} (-1 + a + b)^2$$

$$4 B = b^2 + (-c + n) b + a^2 + 3 a c - n a - 2 n c - 4 a - c + n + 1$$

$$- \frac{4 a (a c - c n - a - c + n + 1)}{-1 + a + b}$$

$$C = \frac{a (-1 + b) (b + n) (c - 1) (a - n - 1) (a + b - c)}{(a + b) (a + b - 2) (-1 + a + b)^2}$$

(5)

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> solve([-a^6+3*a^5*c+3*a^5*n+a^4*b^2-a^4*b*c+a^4*b*n-3*a^4*c^2-8*
a^4*c*n-3*a^4*n^2-2*a^3*b^2*c-2*a^3*b^2*n+4*a^3*b*c^2-4*a^3*b*
n^2+8*a^3*c^2*n+8*a^3*c*n^2+a^2*b^4-2*a^2*b^3*c+2*a^2*b^3*n-2*
a^2*b^2*c^2-2*a^2*b^2*n^2-8*a^2*b*c^2*n+8*a^2*b*c*n^2-8*a^2*c^2*
n^2-a*b^4*c-a*b^4*n+4*a*b^3*c^2-4*a*b^3*n^2+8*a*b^2*c^2*n+8*a*
b^2*c*n^2-b^6+3*b^5*c-3*b^5*n-3*b^4*c^2+8*b^4*c*n-3*b^4*n^2-8*
b^3*c^2*n+8*b^3*c*n^2-8*b^2*c^2*n^2-4*A*a^4+8*A*a^3*c+8*A*a^3*
n-8*A*a^2*b^2+8*A*a^2*b*c-8*A*a^2*b*n-12*A*a^2*c^2-8*A*a^2*c*
n-12*A*a^2*n^2+8*A*a*b^2*c+8*A*a*b^2*n+8*A*a*b*c^2-8*A*a*b*
n^2+16*A*a*c^2*n+16*A*a*c*n^2-4*A*b^4+8*A*b^3*c-8*A*b^3*n-12*A*
b^2*c^2+8*A*b^2*c*n-12*A*b^2*n^2-16*A*b*c^2*n+16*A*b*c*n^2-16*A*

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$c^2n^2+4B^2a^4-8B^2a^3c-8B^2a^3n-8B^2a^2b^2+8B^2a^2b^2c-8B^2a^2b^2n+16B^2a^2c^2n+8B^2a^2b^2c+8B^2a^2b^2n+4B^2b^4-8B^2b^3c+8B^2b^3n-16B^2b^2c^2n-a^4c+a^4n-4a^3b^2c-4a^3b^2n+4a^3c^2-4a^3n^2+10a^2b^2c-10a^2b^2n-4a^2b^2c^2+32a^2b^2c^2n-4a^2b^2n^2-8a^2c^2n+8a^2c^2n^2-4a^2b^3c-4a^2b^3n-4a^2b^2c^2+4a^2b^2n^2-16a^2b^2c^2n-16a^2b^2c^2n^2-b^4c+b^4n+4b^3c^2+4b^3n^2+8b^2c^2n-8b^2c^2n^2+16b^2c^2n^2-16A^2a^2+16A^2a^2c+16A^2a^2n-16A^2b^2+16A^2b^2c-16A^2b^2n-16A^2c^2-16A^2c^2n^2+8A^2a^2c-8A^2a^2n-32A^2a^2b^2c-32A^2a^2b^2n+8A^2a^2c^2-8A^2a^2n^2+8A^2b^2c-8A^2b^2n+8A^2b^2c^2+48A^2b^2c^2n+8A^2b^2n^2-16A^2c^2n+16A^2c^2n^2+8B^2a^2c-8B^2a^2n-16B^2a^2b^2c-16B^2a^2b^2n+8B^2b^2c-8B^2b^2n+32B^2b^2c^2n+a^4-2a^3c-2a^3n-10a^2b^2+10a^2b^2c-10a^2b^2n-2a^2c^2-2a^2c^2n+10a^2b^2c+10a^2b^2n-4a^2b^2c^2+4a^2b^2n^2+8a^2c^2n+8a^2c^2n^2+b^4-2b^3c+2b^3n-2b^2c^2-16b^2c^2n-2b^2c^2n^2+8b^2c^2n^2-8b^2c^2n^2+64A^2B+16A^2c-16A^2n+64A^2B^2-8A^2a^2+8A^2a^2c+8A^2a^2n-8A^2b^2+8A^2b^2c-8A^2b^2n-12A^2c^2+8A^2c^2n-12A^2n^2-8B^2a^2+8B^2a^2c+8B^2a^2n-8B^2b^2+8B^2b^2c-8B^2b^2n-16B^2c^2n-2a^2c^2+2a^2n^2-4a^2b^2c-4a^2b^2n+4a^2c^2-4a^2n^2-2b^2c^2+2b^2n^2+4b^2c^2+4b^2n^2-8c^2n+8c^2n^2-16A^2+8A^2c-8A^2n-8B^2c+8B^2n+a^2-a^2c-a^2n+b^2-b^2c+b^2n-3c^2+8c^2n-3n^2-4A+4B+3c-3n-1, A^2C^2(a^4-2a^3c-2a^3n-2a^2b^2+2a^2b^2c-2a^2b^2n+4a^2c^2n+2a^2b^2c+2a^2b^2n+b^4-2b^3c+2b^3n-4b^2c^2n+2a^2c^2-2a^2n^2-4a^2b^2c-4a^2b^2n+2b^2c^2-2b^2n^2+8b^2c^2n-2b^2c^2n^2+16A^2+32A^2B-2a^2+2a^2c+2a^2n-2b^2+2b^2c-2b^2n-4c^2n-2c^2n^2+1)], {A,B}) ;$

$$\left\{ A=0, B=\frac{1}{4} \left(a^6-3a^5c-3a^5n-a^4b^2+a^4bc-a^4bn+3a^4c^2+8a^4cn+3a^4n^2 \right. \right. \quad (6)$$

$$\left. +2a^3b^2c+2a^3b^2n-4a^3bc^2+4a^3bn^2-8a^3c^2n-8a^3cn^2-a^2b^4+2a^2b^3c-2a^2b^3n+2a^2b^2c^2+2a^2b^2n^2+8a^2bc^2n-8a^2bcn^2+8a^2c^2n^2+a^2b^4c \right.$$

$$\left. +a^2b^4n-4a^2b^3c^2+4a^2b^3n^2-8a^2b^2c^2n-8a^2b^2cn^2+b^6-3b^5c+3b^5n+3b^4c^2-8b^4cn+3b^4n^2+8b^3c^2n-8b^3cn^2+8b^2c^2n^2+a^4c-a^4n+4a^3bc+4a^3bn \right.$$

$$\left. -4a^3c^2+4a^3n^2-10a^2b^2c+10a^2b^2n+4a^2bc^2-32a^2bcn+4a^2bn^2+8a^2c^2n-8a^2cn^2+4a^2b^3c+4a^2b^3n+4a^2b^2c^2-4a^2b^2n^2+16ab^2c^2n \right.$$

$$\left. +16ab^2cn^2+b^4c-b^4n-4b^3c^2-4b^3n^2-8b^2c^2n+8b^2cn^2-16b^2c^2n^2-a^4+2a^3c+2a^3n+10a^2b^2-10a^2bc+10a^2bn+2a^2c^2+2a^2n^2-10a^2b^2c \right.$$

$$\left. -10a^2b^2n+4ab^2c^2-4ab^2n^2-8a^2c^2n-8a^2cn^2-b^4+2b^3c-2b^3n+2b^2c^2+16b^2cn+2b^2n^2-8b^2c^2n+8b^2cn^2+8c^2n^2+2a^2c-2a^2n+4abc+4abn \right.$$

$$\left. -4a^2c^2+4a^2n^2+2b^2c-2b^2n-4b^2c^2-4b^2n^2+8c^2n-8cn^2-a^2+ac+an-b^2+bc-bn+3c^2-8cn+3n^2-3c+3n+1) \right/ (a^4-2a^3c-2a^3n-2a^2b^2$$

$$+2a^2bc-2a^2bn+4a^2cn+2a^2b^2c+2a^2b^2n+b^4-2b^3c+2b^3n-4b^2cn+2a^2c-2a^2n-4abc-4abn+2b^2c-2b^2n+8bcn-2a^2+2ac+2an$$

$$-2b^2+2bc-2bn-4cn-2c+2n+1) \}, \left\{ A=-\frac{1}{4} + \frac{1}{2} a + \frac{1}{2} b - \frac{1}{4} a^2 \right.$$

$$\left. -\frac{1}{2} ab - \frac{1}{4} b^2, B=\frac{1}{4} \frac{1}{-1+a+b} (a^3+a^2b-a^2c-na^2+ab^2+2acb \right.$$

$$\left. +2acn+ab^3-b^2c+nb^2-2ncb-a^2-4ab-2na-b^2+2nc+a+b+c-n \right.$$

$$\begin{aligned}
& -1)\}, \left\{A = -\frac{1}{4}a^2 + \frac{1}{2}ab - \frac{1}{4}b^2 - \frac{1}{2}a + \frac{1}{2}b - \frac{1}{4}, B = \frac{1}{4} \frac{1}{1+a-b} (a^3 \right. \\
& -a^2b - a^2c - na^2 + ab^2 - 2nab + 2acn - b^3 + b^2c - nb^2 + 2ncb + a^2 - 4ab \\
& + 2ac + b^2 - 2nc + a - b - c + n + 1)\}, \left\{A = -\frac{1}{4}a^2 + \frac{1}{2}ab + na - \frac{1}{4}b^2 - nb \right. \\
& -n^2 + \frac{1}{2}a - \frac{1}{2}b - n - \frac{1}{4}, B = \frac{1}{4} \frac{1}{-2n-1+a-b} (a^3 - a^2b - a^2c - 3na^2 \\
& + ab^2 + 6nab + 6an^2 - b^3 + b^2c - 3nb^2 - 6bn^2 - 4n^3 - a^2 + 4ab + 6na - b^2 \\
& - 2bc - 6nb - 6n^2 + a - b + c - 3n - 1)\}, \left\{A = -\frac{1}{4}a^2 - \frac{1}{2}ab + ac - \frac{1}{4}b^2 \right. \\
& + bc - c^2 - \frac{1}{2}a - \frac{1}{2}b + c - \frac{1}{4}, B = \frac{1}{4} \frac{1}{-2c+1+a+b} (a^3 + a^2b - 3a^2c \\
& - na^2 + ab^2 - 6acb + 6ac^2 + b^3 - 3b^2c + nb^2 + 6bc^2 - 4c^3 + a^2 + 4ab - 6ac \\
& + b^2 - 6bc - 2nb + 6c^2 + a + b - 3c + n + 1)\}
\end{aligned}$$

$$> \text{factor}(-1/4+(1/2)*a+(1/2)*b-(1/4)*a^2-(1/2)*a*b-(1/4)*b^2);$$

$$-\frac{1}{4}(-1+a+b)^2 \quad (7)$$

$$> \text{factor}(-(1/4)*a^2+(1/2)*a*b-(1/4)*b^2-(1/2)*a+(1/2)*b-1/4); \text{factor} \\
((1/4)*(a^3-a^2*b-a^2*c-na^2+ab^2-2n*a*b+2*a*c*n-b^3+b^2*c-n* \\
b^2+2*n*c*b+a^2-4*a*b+2*a*c+b^2-2*n*c+a-b-c+n+1)/(1+a-b));$$

$$-\frac{1}{4}(1+a-b)^2$$

$$\frac{1}{4} \frac{1}{1+a-b} (a^3 - a^2b - a^2c - na^2 + ab^2 - 2nab + 2acn - b^3 + b^2c - nb^2 + 2ncb \\
+ a^2 - 4ab + 2ac + b^2 - 2nc + a - b - c + n + 1) \quad (8)$$

$$> \text{factor}(-(1/4)*a^2+(1/2)*a*b+na-(1/4)*b^2-n*b-n^2+(1/2)*a-(1/2)* \\
b-n-1/4);$$

$$-\frac{1}{4}(-2n-1+a-b)^2 \quad (9)$$

$$> \text{factor}(-(1/4)*a^2-(1/2)*a*b+ac-(1/4)*b^2+b*c-c^2-(1/2)*a-(1/2)* \\
b+c-1/4);$$

$$-\frac{1}{4}(-2c+1+a+b)^2 \quad (10)$$