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> restart;
> w:=(x-z)^gamma*x^alpha*(1-x)^beta;
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$$w := (x - z)^\gamma x^\alpha (1 - x)^\beta$$

(1)

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> H:=1;J:=0;G:=-z*(H*alpha^2*z+H*alpha*beta*z+J*alpha^2*z+H*
alpha^2+H*alpha*gamma+4*H*alpha*z+H*beta*z+3*J*alpha*z+4*H*alpha+
H*gamma+3*H*z+2*J*z+3*H)/(alpha^2*z^2+2*alpha*beta*z^2+beta^2*
z^2+alpha^2*z+alpha*beta*z+alpha*gamma*z+5*alpha*z^2+2*beta*
gamma*z+5*beta*z^2+alpha^2+2*alpha*gamma+5*alpha*z+3*beta*z+
gamma^2+3*gamma*z+6*z^2+5*alpha+5*gamma+6*z+6);B:=G/(alpha+1);A:=
0;F:=K/(gamma+alpha+beta+4);E:=(-K*gamma*z+J*alpha+J*beta+J*
gamma-K*beta+4*J)/(alpha^2+2*alpha*beta+2*alpha*gamma+beta^2+2*
beta*gamma+gamma^2+7*alpha+7*beta+7*gamma+12);K:=solve(K*alpha*
gamma*z^2+K*beta*gamma*z^2+C*alpha^3+3*C*alpha^2*beta+3*C*
alpha^2*gamma+3*C*alpha*beta^2+6*C*alpha*beta*gamma+3*C*alpha*
gamma^2+C*beta^3+3*C*beta^2*gamma+3*C*beta*gamma^2+C*gamma^3+J*
alpha*gamma*z+J*beta*gamma*z+J*gamma^2*z-2*K*beta*gamma*z+3*K*
gamma*z^2+9*C*alpha^2+18*C*alpha*beta+18*C*alpha*gamma+9*C*
beta^2+18*C*beta*gamma+9*C*gamma^2-H*alpha^2-2*H*alpha*beta-2*H*
alpha*gamma-H*beta^2-2*H*beta*gamma-H*gamma^2+J*alpha*beta+J*
beta^2+J*beta*gamma+4*J*gamma*z+K*alpha*beta+K*beta*gamma+26*C*
alpha+26*C*beta+26*C*gamma-7*H*alpha-7*H*beta-7*H*gamma+4*J*
beta+3*K*beta+24*C-12*H,K);C:=solve(-C*alpha^2*gamma*z^3-2*C*
alpha*beta*gamma*z^3-C*beta^2*gamma*z^3+B*alpha^2*gamma*z^2+2*B*
alpha*beta*gamma*z^2+B*alpha*gamma^2*z^2+B*beta^2*gamma*z^2+B*
beta*gamma^2*z^2+2*C*alpha*beta*gamma*z^2-5*C*alpha*gamma*z^3+2*
C*beta^2*gamma*z^2-C*beta*gamma^2*z^2-5*C*beta*gamma*z^3+H*alpha*
gamma*z^3+H*beta*gamma*z^3-J*beta*gamma*z^3-2*B*alpha*beta*gamma*
z+4*B*alpha*gamma*z^2-2*B*beta^2*gamma*z-2*B*beta*gamma^2*z+4*B*
beta*gamma*z^2+3*B*gamma^2*z^2+2*C*alpha*beta*gamma*z-C*beta^2*
gamma*z+2*C*beta*gamma^2*z+5*C*beta*gamma*z^2-6*C*gamma*z^3-G*
alpha*gamma*z^2-G*beta*gamma*z^2-H*beta*gamma*z^2+3*H*gamma*
z^3+2*J*beta*gamma*z^2+B*alpha^2*beta+B*alpha*beta^2+2*B*alpha*
beta*gamma+B*beta^2*gamma+B*beta*gamma^2-2*B*beta*gamma*z+3*B*
gamma*z^2-C*alpha^2*beta-2*C*alpha*beta*gamma-C*beta*gamma^2+5*C*
beta*gamma*z+2*G*beta*gamma*z-3*G*gamma*z^2-H*beta*gamma*z-J*
beta*gamma*z+4*B*alpha*beta+3*B*beta^2+4*B*beta*gamma-5*C*alpha*
beta-5*C*beta*gamma-G*alpha*beta-G*beta*gamma+H*alpha*beta+H*
beta*gamma+3*B*beta-6*C*beta-3*G*beta+3*H*beta,C);
```

$$H:=1$$

$$J:=0$$

$$G := -\left(z\left(\alpha^2 z + \alpha \beta z + \alpha^2 + \alpha \gamma + 4 \alpha z + \beta z + 4 \alpha + \gamma + 3 z + 3\right)\right) / \left(\alpha^2 z^2 + 2 \alpha \beta z^2 + \beta^2 z^2 + \alpha^2 z + \alpha \beta z + \alpha \gamma z + 5 \alpha z^2 + 2 \beta \gamma z + 5 \beta z^2 + \alpha^2 + 2 \alpha \gamma + 5 \alpha z + 3 \beta z + \gamma^2 + 3 \gamma z + 6 z^2 + 5 \alpha + 5 \gamma + 6 z + 6\right)$$

$$B := -\left(z\left(\alpha^2 z + \alpha \beta z + \alpha^2 + \alpha \gamma + 4 \alpha z + \beta z + 4 \alpha + \gamma + 3 z + 3\right)\right) / \left(\left(\alpha^2 z^2 + 2 \alpha \beta z^2 + \beta^2 z^2 + \alpha^2 z + \alpha \beta z + \alpha \gamma z + 5 \alpha z^2 + 2 \beta \gamma z + 5 \beta z^2 + \alpha^2 + 2 \alpha \gamma + 5 \alpha z + 3 \beta z + \gamma^2 + 3 \gamma z + 6 z^2 + 5 \alpha + 5 \gamma + 6 z + 6\right)(\alpha + 1)\right)$$

$$A:=0$$

$$F := \frac{K}{\gamma + \alpha + \beta + 4}$$

$$E := \frac{-K\gamma z - K\beta}{\alpha^2 + 2\alpha\beta + 2\alpha\gamma + \beta^2 + 2\beta\gamma + \gamma^2 + 7\alpha + 7\beta + 7\gamma + 12}$$

$$K := -\left(C\alpha^3 + 3C\alpha^2\beta + 3C\alpha^2\gamma + 3C\alpha\beta^2 + 6C\alpha\beta\gamma + 3C\alpha\gamma^2 + C\beta^3 + 3C\beta^2\gamma + 3C\beta\gamma^2 + C\gamma^3 + 9C\alpha^2 + 18C\alpha\beta + 18C\alpha\gamma + 9C\beta^2 + 18C\beta\gamma + 9C\gamma^2 + 26C\alpha + 26C\beta + 26C\gamma - \alpha^2 - 2\alpha\beta - 2\alpha\gamma - \beta^2 - 2\beta\gamma - \gamma^2 + 24C - 7\alpha - 7\beta - 7\gamma - 12\right) / (\alpha\gamma z^2 + \beta\gamma z^2 - 2\beta\gamma z + 3\gamma z^2 + \alpha\beta + \beta\gamma + 3\beta)$$

$$C := (\alpha z^2 + \beta z^2 + \alpha z + 3z^2 + \alpha + \gamma + 3z + 3) / (\alpha^2 z^2 + 2\alpha\beta z^2 + \beta^2 z^2 + \alpha^2 z + \alpha\beta z + \alpha\gamma z + 5\alpha z^2 + 2\beta\gamma z + 5\beta z^2 + \alpha^2 + 2\alpha\gamma + 5\alpha z + 3\beta z + \gamma^2 + 3\gamma z + 6z^2 + 5\alpha + 5\gamma + 6z + 6) \quad (2)$$

> sigma:=collect(simplify(A+B*x+C*x^2+E*x^3+F*x^4),[x,z],factor);

$$\sigma := -((\gamma + \alpha + \beta + 3)x^4) / ((\alpha + \beta + 3)(\alpha + \beta + 2)z^2 + (\alpha^2 + \alpha\beta + \alpha\gamma + 2\beta\gamma + 5\alpha + 3\beta + 3\gamma + 6)z + (\gamma + \alpha + 3)(\gamma + \alpha + 2)) - ((-\gamma z - \beta)x^3) / ((\alpha + \beta + 3)(\alpha + \beta + 2)z^2 + (\alpha^2 + \alpha\beta + \alpha\gamma + 2\beta\gamma + 5\alpha + 3\beta + 3\gamma + 6)z + (\gamma + \alpha + 3)(\gamma + \alpha + 2)) - (((-\alpha - \beta - 3)z^2 + (-\alpha - 3)z - \gamma - \alpha - 3)x^2) / ((\alpha + \beta + 3)(\alpha + \beta + 2)z^2 + (\alpha^2 + \alpha\beta + \alpha\gamma + 2\beta\gamma + 5\alpha + 3\beta + 3\gamma + 6)z + (\gamma + \alpha + 3)(\gamma + \alpha + 2)) - (((\alpha + \beta + 3)z^2 + (\gamma + \alpha + 3)z)x) / ((\alpha + \beta + 3)(\alpha + \beta + 2)z^2 + (\alpha^2 + \alpha\beta + \alpha\gamma + 2\beta\gamma + 5\alpha + 3\beta + 3\gamma + 6)z + (\gamma + \alpha + 3)(\gamma + \alpha + 2)) \quad (3)$$

> tau:=collect(simplify(G+H*x+J*x^2+K*x^3),[x,t],factor);

$$\tau := -((\gamma + \alpha + \beta + 4)(\gamma + \alpha + \beta + 3)x^3) / (\alpha^2 z^2 + 2\alpha\beta z^2 + \beta^2 z^2 + \alpha^2 z + \alpha\beta z + \alpha\gamma z + 5\alpha z^2 + 2\beta\gamma z + 5\beta z^2 + \alpha^2 + 2\alpha\gamma + 5\alpha z + 3\beta z + \gamma^2 + 3\gamma z + 6z^2 + 5\alpha + 5\gamma + 6z + 6) + x - (z(\alpha + 1)(\alpha z + \beta z + \alpha + \gamma + 3z + 3)) / (\alpha^2 z^2 + 2\alpha\beta z^2 + \beta^2 z^2 + \alpha^2 z + \alpha\beta z + \alpha\gamma z + 5\alpha z^2 + 2\beta\gamma z + 5\beta z^2 + \alpha^2 + 2\alpha\gamma + 5\alpha z + 3\beta z + \gamma^2 + 3\gamma z + 6z^2 + 5\alpha + 5\gamma + 6z + 6) \quad (4)$$

> diff(sigma*w,x)-tau*w:

> collect(factor(expand(%)),[x],factor);

0

(5)