```
> restart;
> P := x^2;
  Q := (x-1)^3*(x^2-2);
```

$$P := x^2$$

$$Q := (x-1)^3\left(x^2-2\right)$$

```
> B := gcd(Q,diff(Q,x));
```

$$B := (x-1)^2$$

```
> alias(D=DD):
> D := Q/B;
```

$$D := (x-1)\left(x^2-2\right)$$

```
> H := normal(D*diff(B,x)/B);
```

$$H := 2x^2 - 4$$

$\deg(A) < \deg(B),\ \deg(C) < \deg(D)$

```
> A := a[0]+a[1]*x;
```

$$A := a_0 + a_1 x$$

```
> C := c[0]+c[1]*x+c[2]*x^2;
```

$$C := c_0 + c_1 x + c_2 x^2$$

```
> ANSATZ := A/B+Int(C/D,x);
```

$$ANSATZ := \frac{a_0 + a_1 x}{(x-1)^2} + \int \frac{c_0 + c_1 x + c_2 x^2}{(x-1)\left(x^2-2\right)}\,\mathrm{d}x$$

```
> P=diff(A,x)*D-A*H+C*B;
```

$$x^2 = a_1(x-1)\left(x^2-2\right) - \left(a_0 + a_1 x\right)\left(2x^2-4\right) + \left(c_0 + c_1 x + c_2 x^2\right)(x-1)^2$$

```
> zero := collect(P-diff(A,x)*D+A*H-C*B,x);
```

$$zero := -c_2 x^4 + \left(a_1 - c_1 + 2c_2\right)x^3 + \left(1 + a_1 + 2a_0 - c_0 + 2c_1 - c_2\right)x^2 + \left(-2a_1 + 2c_0\right.$$
$$\left. - c_1\right)x - 2a_1 - 4a_0 - c_0$$

```
> eqns := {coeffs(zero,x)};
```

$$eqns := \left\{ -2a_1 + 2c_0 - c_1,\, a_1 - c_1 + 2c_2,\, -2a_1 - 4a_0 - c_0,\, 1 + a_1 + 2a_0 - c_0 + 2c_1 - c_2, \right.$$
$$\left. -c_2 \right\}$$

```
> sol := solve(eqns);
```

$$sol := \left\{ c_2 = 0,\, a_0 = -\frac{7}{2},\, c_1 = 4,\, c_0 = 6,\, a_1 = 4 \right\}$$

```
> ans := sort( eval(ANSATZ,sol), x );
```

$$ans := \frac{4\,x - \dfrac{7}{2}}{(x-1)^2} + \int \frac{4\,x + 6}{(x-1)\left(x^2 - 2\right)}\,\mathrm{d}x$$

> **simplify(diff(ans,x) - P/Q);**

$$0$$