```
DSolve[x'[t] + x[t]/t^2 == 1/t^3, x[t], t]
```

$$\left\{\left\{x[t] \to 1 + \frac{1}{t} + e^{\frac{1}{t}} C[1]\right\}\right\}$$

```
Integrate[E^(-1/t)/t^3, t]
```

$$e^{-1/t}\left(1 + \frac{1}{t}\right)$$

```
Integrate[E^(-1/t)/t^2, t]
```

$$e^{-1/t}$$

```
{{x[t] -> 1 + 1/t + E^(1/t) C[1]}}[[1, 1, 2]]
```

$$1 + \frac{1}{t} + e^{\frac{1}{t}} C[1]$$

```
DSolve[y'[x] - y[x]/x == y[x]^2/x, y[x], x]
```

$$\left\{\left\{y[x] \to -\frac{e^{C[1]}\, x}{-1 + e^{C[1]}\, x}\right\}\right\}$$

```
DSolve[y[x] (y[x] + 1) + x (x - 1) y'[x] == 0, y[x], x]
```

$$\left\{\left\{y[x] \to -\frac{e^{C[1]}\, x}{-1 + x + e^{C[1]}\, x}\right\}\right\}$$

```
y[x] /. DSolve[(x + 2 y[x] + 3) + (2 x + 4 y[x] - 1) y'[x] == 0, y[x], x] // Simplify
```

$$\left\{\frac{1}{4}\left(1 - 2x - \sqrt{1 - 28x + 16 C[1]}\right), \frac{1}{4}\left(1 - 2x + \sqrt{1 - 28x + 16 C[1]}\right)\right\}$$

```
y[x] /. DSolve[(x + 2 y[x]) + (2 x + 4 y[x]) y'[x] == 0, y[x], x] // Simplify
```

$$\left\{-\frac{x}{2}, -\frac{x}{2} + C[1]\right\}$$

```
F = (x + y) Sin[y];
{D[F, x], D[F, y]} // Simplify
```

```
{Sin[y], (x + y) Cos[y] + Sin[y]}
```

```
Integrate[Sin[y], x]
```

```
x Sin[y]
```

```
Φ = ( t   t^-1 )
    ( t  3 t^-1 );
t D[Φ, t] - ( 2  -1 ) . Φ
            ( 3  -2 )
```

```
{{0, 0}, {0, 0}}
```

```
2 Inverse[Φ] // MatrixForm
```

$$\begin{pmatrix} \frac{3}{t} & -\frac{1}{t} \\ -t & t \end{pmatrix}$$

```
Inverse[Φ].{0, 2} // Simplify
```

$$\left\{-\frac{1}{t}, t\right\}$$

```
v = (( t   t^-1 )) . Integrate[Inverse[Φ].{0, 2}, t] // Simplify
    ( t  3 t^-1 ))
```

$$\left\{\frac{1}{2}(t - 2\,t\,\text{Log}[t]),\ \frac{3\,t}{2} - t\,\text{Log}[t]\right\}$$

```
t D[v, t] - ( 2  -1 ) . v - {0, 2 t} // Simplify
            ( 3  -2 )
```

```
{0, 0}
```