▼ mplD002R.mw

▼ a)

```
> y:=C*exp(-x)+x^2-2*x;   # RE
```
$$y := C e^{-x} + x^2 - 2x \tag{1.1.1}$$

```
> vasen:=diff(y,x)+y;
```
$$vasen := -2 + x^2 \tag{1.1.2}$$

```
> oikea:=x^2-2;
```
$$oikea := -2 + x^2 \tag{1.1.3}$$

```
> vasen=oikea;
```
$$-2 + x^2 = -2 + x^2 \tag{1.1.4}$$

Tarkistus oli helppoa. Miten sitten loytaisimme RE:n Katotaan, osaako Maple.
Maplessa on dsolve-komento diffyhtaloihin. Kokeillaan, osaako se..

```
> y:='y':x:='x':
> dy:=diff(y(x),x)+y(x)=x^2-2; # Diffyht%l^n esitysmuoto
```
$$dy := \frac{d}{dx} y(x) + y(x) = -2 + x^2 \tag{1.1.5}$$

```
> dsolve(dy,y(x));
```
$$y(x) = -2x + x^2 + e^{-x} \_C1 \tag{1.1.6}$$

▼ b)

```
> y:=a*cos(x)+b*sin(x);
```
$$y := a \cos(x) + b \sin(x) \tag{1.2.1}$$

```
> diff(y,x,x)+y;
```
$$0 \tag{1.2.2}$$

Kyl vaan! Kokeillaan taas dsolvea:

```
> y:='y':
> dsolve(diff(y(x),x,x)+y(x)=0,y(x));
```
$$y(x) = \_C1 \sin(x) + \_C2 \cos(x) \tag{1.2.3}$$

Joooo!

▼ c)

```
> d3y:=exp(x);
```
$$d3y := e^x \tag{1.3.1}$$

```
> d2y:=int(dy3,x)+c1;
```
$$d2y := dy3 \, x + c1 \tag{1.3.2}$$

```
> d1y:=int(dy2,x)+c2;
```
$$\tag{1.3.3}$$

$$d1y := dy2\,x + c2 \tag{1.3.3}$$

```
> y:=int(dy1,x)+c3;
```

$$y := dy1\,x + c3 \tag{1.3.4}$$

Tarkistus:
```
> diff(y,x,x,x);
```

$$0 \tag{1.3.5}$$

```
> y:='y': dsolve(diff(y(x),x,x,x)=exp(x),y(x));
```

$$y(x) = e^x + \frac{1}{2}\,\_C1\,x^2 + \_C2\,x + \_C3 \tag{1.3.6}$$

d)

```
> restart:
> REh:=x^2+y(x)^2=C;
```

$$REh := x^2 + y(x)^2 = C \tag{1.4.1}$$

```
> diff(REh,x);
```

$$2\,x + 2\,y(x)\left(\frac{d}{dx}\,y(x)\right) = 0 \tag{1.4.2}$$

```
> dsolve(%,y(x),implicit);
```

$$y(x)^2 + x^2 - \_C1 = 0 \tag{1.4.3}$$

```
> dsolve(%%,y(x));
```

$$y(x) = \sqrt{-x^2 + \_C1}\,,\, y(x) = -\sqrt{-x^2 + \_C1} \tag{1.4.4}$$