```
>
```
```
Warning, the name changecoords has been redefined

Warning, the protected names norm and trace have been redefined and unprotected
```

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Math 152

Lab 6 (Ch.7, #3-6)

3)

```
> restart: with(DEtools): with(plots):
```
```
Warning, the name changecoords has been redefined
```

```
> eq1:=diff(y(t),t) + cos(x)*y(t) = cos(x); solution1:=dsolve(eq1,
  y(t));
```

$$eq1 := \left(\frac{\partial}{\partial t}\,\mathrm{y}(t)\right) + \cos(x)\,\mathrm{y}(t) = \cos(x)$$

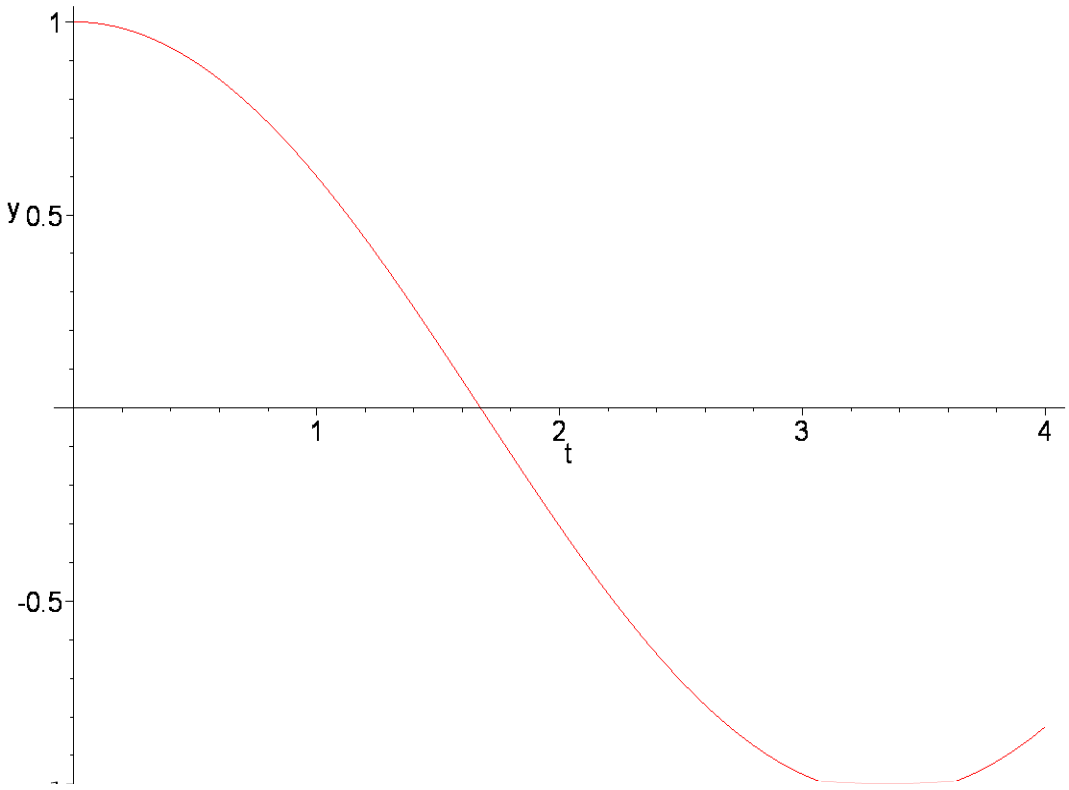
$$solution1 := \mathrm{y}(t) = 1 + \mathbf{e}^{(-\cos(x)\,t)}\,\_C1$$

4)

```
> y:='y';
  eq2:=diff(y(t),t$2) + sin(y(t)) = 0; solution2:=dsolve({eq2, y(0)
  = 1, D(y)(0) = 0}, y(t), numeric); odeplot(solution2,
  [t,y(t)],0..4);
```

$$y := y$$

$$eq2 := \left(\frac{\partial^2}{\partial t^2}\,\mathrm{y}(t)\right) + \sin(\mathrm{y}(t)) = 0$$



5)

```
> y:'y'; eq3:=diff(y(x),x) + y(x) = sin(x);
```

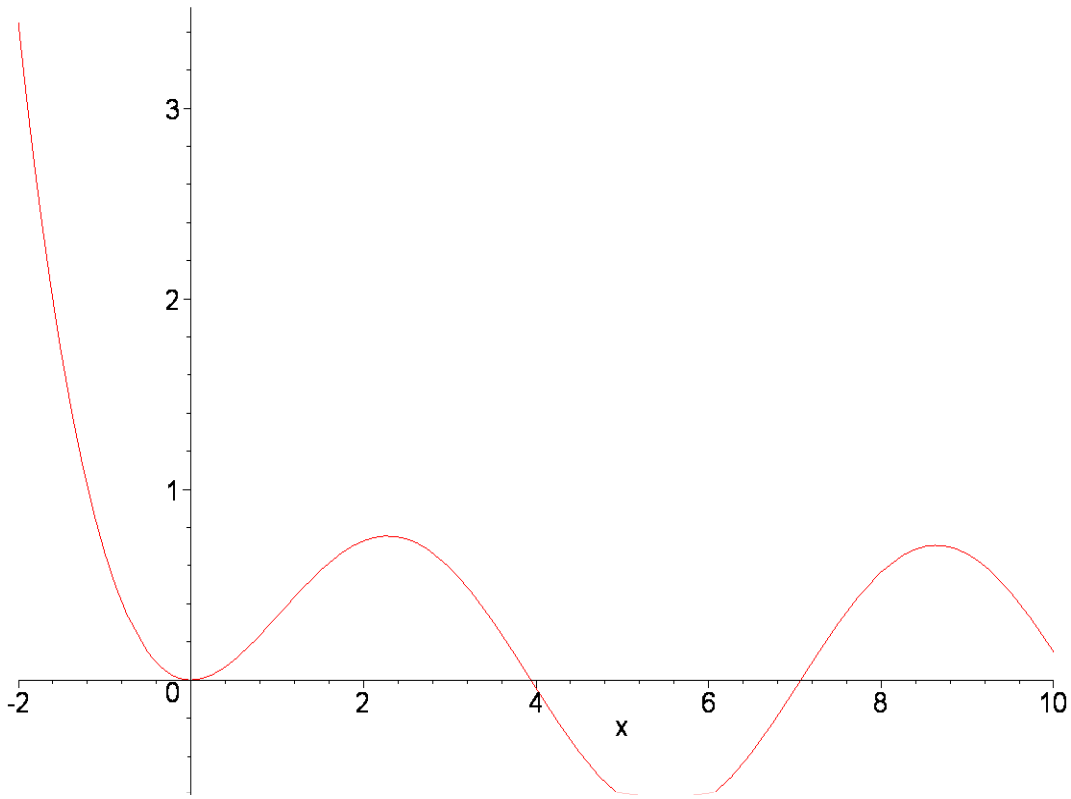
$$eq3 := \left(\frac{\partial}{\partial x}\,y(x)\right) + y(x) = \sin(x)$$

```
> solution3_numeric:=dsolve({eq3, y(0) = 0}, y(x), numeric);
```

```
> solution3_exact:=rhs(dsolve({eq3, y(0) = 0}, y(x)));
```

$$solution3\_exact := -\frac{1}{2}\cos(x) + \frac{1}{2}\sin(x) + \frac{1}{2}\,\mathbf{e}^{(-x)}$$

```
> plot(solution3_exact, x=-2..10);
```




```
> odeplot(solution3, [x,y(x)], -2..10);
```

Error, (in odeplot) input is not a valid dsolve/numeric solution

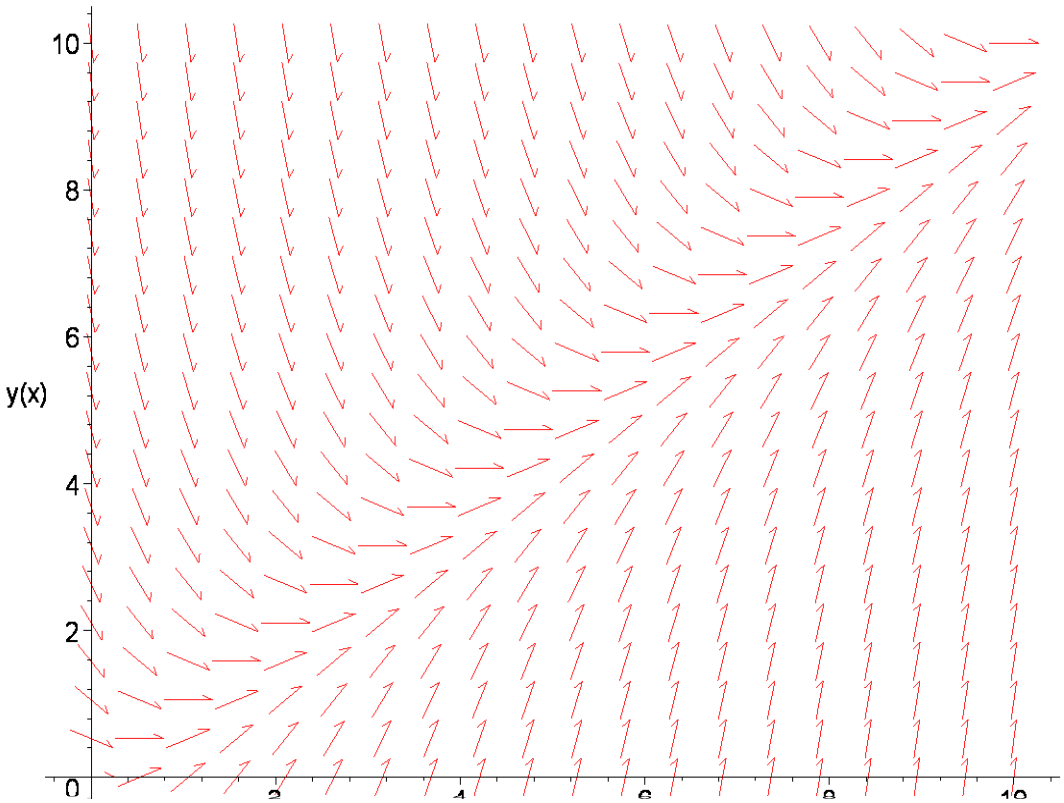
6)

```
> eq4:=diff(y(x),x) = x - y(x);
```

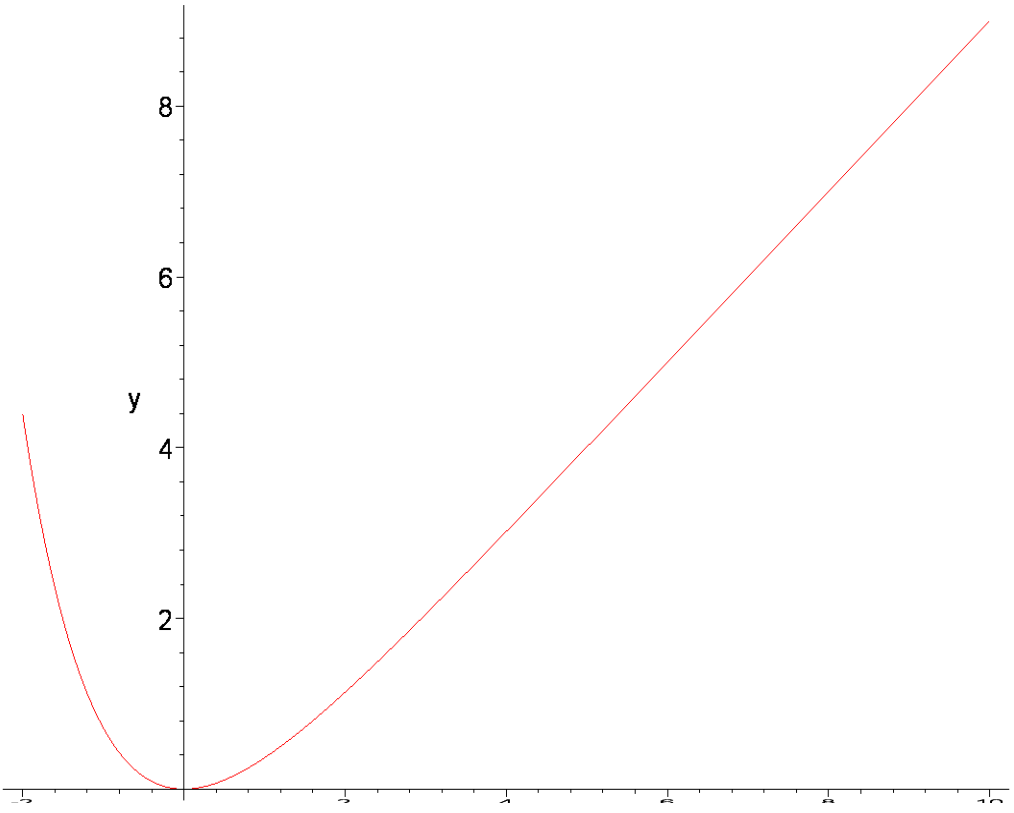
$$eq4 := \frac{\partial}{\partial x} y(x) = x - y(x)$$

```
> soln4:=dsolve({eq4, y(0)=0}, y(x), numeric);
```

```
> dfieldplot(eq4, y(x), x=0..10, y=0..10);
```




```
> odeplot(soln4, [x,y(x)], -2..10);
```

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