

## Matlab notes Math 160 Homework 5.

To solve a differential equation, create one using a double equal sign, label it with a single equal sign, and then use the "dsolve" command.

```
syms y(x)
Eq = diff(y,x)==2*y;
dsolve(Eq)
```

$$\text{ans} = C_1 e^{2x}$$

You can find a solution for an initial value problem by including the initial conditions in the command.

```
IVP = y(0)==5;
dsolve(Eq, IVP)
```

$$\text{ans} = 5 e^{2x}$$

You don't need to be so careful. You can do all the above using just one line. If you label it with a function, you can find specific values later. Below I have estimated  $y(4)$  to four digits after solving a new differential equation with initial value.

```
sol(x)=dsolve(diff(y,x)==-9*y^2-4, y(1)==2)
```

$$\text{sol}(x) = \frac{2 \tan(\text{atan}(3) - 6x + 6)}{3}$$

```
vpa(sol(4),4)
```

$$\text{ans} = -1.144$$