

## Lesson 5

### Definite and Indefinite Integrals

#### Initializations

```
> restart;  
>
```

#### 5.1 Definite Integrals

##### Examples

###### Example 5.1.1

Compute  $\int_0^{\pi} \sin x \, dx$ .

###### Solution

The code which evaluates a definite integral is relatively simple. First we use the inert integration command **Int** to show the integral symbolically on the screen. Then we evaluate the integral.

```
> e1:=Int(sin(x), x=0..Pi);
```

$$e1 := \int_0^{\pi} \sin(x) \, dx \quad (2.1.1.1)$$

```
> e2:=value(e1);
```

$$e2 := 2 \quad (2.1.1.2)$$

Alternatively one can use the active integration command **int** to immediately evaluate the integral.

```
> e3:=int(sin(x), x=0..Pi);
```

$$e3 := 2 \quad (2.1.1.3)$$

```
>
```

#### 5.2 Indefinite Integrals

##### Examples

###### Example 5.2.1

Compute  $\int \sin x \, dx$ .

### Solution

The syntax for an indefinite integral resembles the code for a definite integral. The example speaks for itself.

```
> e1:=Int(sin(x), x);
```

$$e1 := \int \sin(x) dx \quad (3.1.1.1)$$

```
> e2:=value(e1)+C;
```

$$e2 := -\cos(x) + C \quad (3.1.1.2)$$

Observe that Maple does not automatically include the integration constant.

Alternatively one can again use the active integration command **int** to immediately evaluate the integral.

```
> e3:=int(sin(x), x)+C;
```

$$e3 := -\cos(x) + C \quad (3.1.1.3)$$

```
>
```