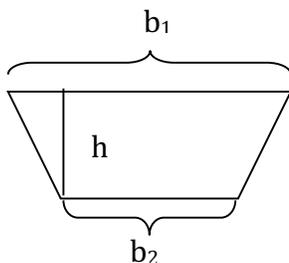


## Lab 02: Designing functions

Create a separate file for each question. Keep them in your “Labs” folder, with the name `l i j q k` for Lab `i j`, question `k`. See **Helpful tips** for information on creating and naming files. Download the headers for each function from the file `labinterface02.rkt`. You can obtain feedback on your work (except warm-up exercises) by submitting it and requesting a public test. The same process is used to perform basic checks on your assignment work.

**Language level:** Beginning Student.

1. [Class exercise with lab instructor assistance] Consider a trapezoid with parallel bases of lengths  $b_1$  and  $b_2$ , and height  $h$ :



Its area is given by the formula  $[(b_1+b_2)/2]*h$ . Create the function *trapezoid-area* that consumes three positive numbers ( $b_1$ ,  $b_2$  and  $h$ ), and produces the area of the corresponding trapezoid.

2. Warm-up exercise [Adapted from HtDP exercise 2.4.2] Type each of the following definitions, one by one, into the *Definitions* window and click Run. Read the error messages and fix the errors.

```
(define (f 1) (+ x 10))  
(define (g x) + x 10)  
(define h(x) (+ x 10))
```

3. Warm-up exercise [Adapted from HtDP exercise 2.4.4] Enter the following Racket program into the *Definitions* window and click Run:

```
(define (somef x)  
  (sin x x))
```

Then, in the *Interactions* window, evaluate the expressions `(somef 10 20)` and `(somef 10)`. Read the error messages and note what DrRacket highlights.

4. Create a function *onehalf* that consumes a positive integer ( $nbr$ ) and produces the closest integer less than or equal to  $nbr$  divided by 2. That is, `(onehalf 16)` and `(onehalf 17)` will both produce 8. Hint: use *quotient*.
5. Create the function *middle-digit* that consumes an integer (called  $nnn$ ) between 100 and 999, inclusive, and produces the middle digit of  $nnn$ . For example, `(middle-digit 345)` produces 4, and `(middle-digit 803)` produces 0. Hint: use *quotient* and *remainder*.

6. Create the function *set-middle-to-zero* that consumes an integer (called *nnn*) between 100 and 999, inclusive, and produces a number like *nnn*, except that the middle digit has been set to 0. For example, *(set-middle-to-zero 345)* produces 305 and *(set-middle-to-zero 104)* produces 104. You may wish to use the function *middle-digit* that you just created

## Helpful tips

**Opening a new file:** Under “File” on the menu bar, select “New” (or “New Tab”, if you wish to add tabs to a current window).

**Opening an existing file:** Under “File” on the menu bar, select “Open...”. This will bring up a window that lets you select a file to open.

**Saving a file:** Press the “Save” button on the window. If this is a new file, you will see a window that lets you choose a name for your file and a directory to put it in.

**Managing files** (general advice): You might wish to organize your account so that you have folders for labs, assignments, teachpacks, and other downloads from the course Web site.