

CMSC 10500-1: Homework 1

(due on Friday June 25th)

In your DrScheme environment type in the following program:

```
;; discriminant: number number number -> number
(define (discriminant a b c)
  (sqrt (- (sqr b) (* 4 (* a c)))))

;; solve: number number number -> list of 2 numbers
(define (solve a b c)
  (list (- (- (/ b (* 2 a))) (/ (discriminant a b c) (* 2 a)))
        (+ (- (/ b (* 2 a))) (/ (discriminant a b c) (* 2 a)))))

;; equation: number number -> list of three numbers
(define (equation x y)
  (list 1 (- (+ x y)) (* x y)))
```

1. **(8 pts)** Now in your interactions window, type in the following and record the results:

- (a) (equation -2 3)
(cons 1 (cons -1 (cons -6 empty)))
- (b) (solve 1 -1 -1)
(cons #i-0.6180339887498949 (cons #i1.618033988749895 empty))
- (c) (equation 3 5)
(cons 1 (cons -8 (cons 15 empty)))
- (d) (solve 2 -16 30)
(cons 3 (cons 5 empty))

2. **(4 pts)** Explain what solve, equation and discriminant do?

- (a) `discriminant` calculates the discriminant of the equation $ax^2 + bx + c = 0$
- (b) `solve` solves a given quadratic equation
- (c) `equation` finds a quadratic equation whose roots are given as input (The last two examples should have clued you in to that).