order of operations

# Racket program

; What is the connection between a symbol and

; the symbols from which it is computed?

; coefs for x^2 -3x +2 = 0

; for which discriminant = 1

(define a 1)

(define b -3)

(define c 2)

(define discriminant (- (\* b b) (\* 4 a c)))

(display discriminant) (newline)

; coefs for x^2 - 9 = 0,

; for which discriminant = 36

(define a 1)

(define b 0)

(define c -9)

; What value will be displayed, and why?

(display discriminant) (newline)

# procedure calls, in the chronological order

| **procedure** | **justification** | **result** |
| --- | --- | --- |
| ; What is the…  ; the symbols …  ; coeffs for x^2 …  ; for which… | rule 9, on comments, in Piazza’s [Racket Rules](https://piazza.com/class/ie8tphcw4gf39z?cid=110) | None. |
| (define a 1) | rule 8a: Since symbol a “has not already been defined, it is assigned a new value in a newly-reserved slot in the main memory.” ([RR](https://piazza.com/class/ie8tphcw4gf39z?cid=110)) The new value is 1 | 1 in a symbol table entry identified with symbol a |
| (define b -3) | rule 8a: Since symbol a “has not already been defined, it is assigned a new value in a newly-reserved slot in the main memory.” (RR) The new value is -3 | -3 in a symbol table entry identified with symbol b |
| (define c 2) | rule 8a: Since symbol a “has not already been defined, it is assigned a new value in a newly-reserved slot in the main memory.” (RR) The new value is 2 | 2 in a symbol table entry identified with symbol c |
| (\* b b) | rule 10: when an expression uses a symbol, Racket recalls the value of the symbol from the symbol table. The value replaces the name of the symbol. | 9 |
| (\* 4 a c) | rule 10: when an expression uses a symbol, Racket recalls the value of the symbol from the symbol table. The value replaces the name of the symbol. | 8 |
| (- 9 8) | rule 5: order of operations | 1 |
| (define discriminant 1) | rule 8a: Since symbol a “has not already been defined, it is assigned a new value in a newly-reserved slot in the main memory.” (RR) The new value is 1. | 1 in a symbol table entry identified with symbol discriminant |
| (display discriminant) | rule 6: use the (display) and (newline) functions when you want to see a value that Racket computes | a squiggle like 1 in the REPL pane. |
| (newline) | rule 6: use the (display) and (newline) functions when you want to see a value that Racket computes | a blank line in the REPL pane |
| ; coefs for x^2 - 9 = 0,  ; for which dis… | rule 9: anything that comes after a semicolon that is also on the same line won’t be evaluated. | none |
| (define a 1) | rule 8b: since the symbol has already been defined, the previous value is replaced with the new value of the symbol and the old value does not exist anymore. The new value is 1. | 1 in a symbol table entry identified with symbol a |
| (define b 0) | rule 8b: since the symbol has already been defined, the previous value is replaced with the new value of the symbol and the old value does not exist anymore. The new value is 0. | 0 in a symbol table entry identified with symbol b |
| (define c -9) | rule 8b: since the symbol has already been defined, the previous value is replaced with the new value of the symbol and the old value does not exist anymore. The new value is -9. | -9 in a symbol table entry identified with symbol c |
| ; What value will … | rule 9: anything that comes after a semicolon that is also on the same line won’t be evaluated. | none |
| (display discriminant) | rule 6: use the (display) and (newline) functions when you want to see a value that Racket computes | a squiggle like 1 in the REPL pane. |
| (newline) | rule 6: use the (display) and (newline) functions when you want to see a value that Racket computes | a blank line in the REPL pane |

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