

Diagnostic Quiz Post-Mortem

CS 135 Fall 2026

Q1:

- b) presented various computational mistakes, mainly from incorrect evaluations of $(- 56 21 10)$
- c) $(= 6 7)$ and $(< 7 6)$ are both false, so the or is also false.
- e) although math dictates that $\sin(\pi) = 0$, pi in Racket is an inexact number, meaning that $(\sin \pi)$ is only approximately 0, and thus the answer is false.

Q2:

- a) `(first lst)` outputs the first element of the list, in this case 1. Still, some students answered `(cons 1)`, as if first requires the output to be a list, which is not the case.
- b) and c) some listed just the first element of `lst`, others used an incorrect list notation, e.g.:
 - `'a true -1`
 - `'a, true, -1`
 - `('a true -1)`
- d) the rest of a list is a list, so it can't be a symbol

Q3:

- In part a) many students substituted the function before simplifying the function input
- In part a) there were infrequently minor arithmetic errors
- In part b) students frequently did not show the evaluation resolving to "false" before being eliminated (instead removing the line all in one step)
- In both parts, students frequently did not correctly substitute in parameters; they are supposed to replace all instances all at one on function call.
- In both parts, students infrequently didn't remove the defines from their trace

Q4:

- There were a lot of incorrect contracts. Please see the [Style Guide](#) for details on how to write contracts.
- Many students used `cons` instead of `mk-point` in their test cases. Because Point is a defined data type, we must use `mk-point` instead of treating it as a list.
- Many students misunderstood that you were supposed to write the function `farther` and instead wrote the function `distance-to-origin`.
- Students often tried to compare points' `a` and `b`'s distance to the origin with `(< a b)`, rather than `(< (distance-to-origin a) (distance-to-origin b))`.
- Some students mistakenly thought `distance-to-origin` took in an x and y coordinate rather than a Point.
- Some students misunderstood that `farther` was meant to produce a point that was farther from the origin than `a` and `b`, rather than produce whichever consumed point was farther from the origin.

Q5:

- Many students used `(= n 0)` and `(- n 1)` instead of `(zero? n)` or `(sub1 n)` for the base case and recursion.
- Many students didn't remember the exact way of calling the exponent function. The correct way is `(expt m n)`.
- Some students did `(sum-of-powers m n)` instead of `(sum-of-powers n m)` as stated in the question. No mark was deducted if the mistake was consistent.
- Some students did `(sum-of-powers n m)`, but treated `n` as the base and `m` as the exponent. No mark was deducted if the mistake was consistent.
- Many students didn't have enough coverage for their tests. We are looking for at least three test cases: one with `n=0`, and two other ones, as well as `m=1` isn't used more than once.

Q6:

- Many students had problems with the syntax of math functions. Most commonly `(- b)` would be written as `-b` and `(* 2 a)` would be written as `2a`.
- Many students did not read the question correctly and their quadratic function would return 1 element if both roots were the same and 2 if they were different. We asked that your function would always return 2 elements.
- Many students incorrectly called their helper/quadratic(+/-) functions where they only used the function name and did not pass any of the parameters (`a`, `b`, `c`) into their function.
- Many students were missing `empty` at the end of their list of two elements.
- Many students did not write the helper function for the common part of $\sqrt{b^2 - 4ac}$ when we explicitly asked for this to be written.

Q7:

- Some students produced 0 instead of 1 in their base case. This would result in the function returning 0 no matter what is contained in their list of numbers. By multiplying by 1 in the base case, you are preserving the multiplication done earlier in the recursion.
- Some students added extra brackets (eg. (first (lon)) instead of (first lon) and (rest (lon)) instead of (rest lon)). Doing so would produce an error in DrRacket because it expects a function call after a bracket, not a list.
- Some students did not know what to write for the recursive call. The recursive call should be (multiply-list (rest lon)). Some students would combine rest and first in this call, which is incorrect because you want to make sure you are passing a list back into the function, not a number.
- Sometimes, students used (zero? lon) instead of (empty? lon) for their base case predicate. This is wrong because you are working with a list and not a number.
- Some students wrote empty? instead of (empty? lon) for their base case predicate. empty? needs to be used on a value in order to produce a value.
- In their base case, some students checked if the first item in the list was empty instead of checking if the list was empty. This is wrong because the list will always contain numbers or be empty, so the first item of the list can never be empty.
- Some students used sub1 or add1 in their recursion instead of rest. The only way to pass a shorter version of a list into a function is by using rest, according to our rules of recursion in the course.

Q8:

- Many contracts used "(list Num)", "(listof Int)", or "(listof num)" instead of "(listof Num)"
- Many contracts used "bool", "boolean", or "Boolean" instead of "Bool"
- Many people just wrote "empty?" and passed it no parameter. They should have written "(empty? lst)"
- Many people did not use recursion correctly, writing "(all-negative? lst)", "(rest lst)", "(all-negative? rest)", or "> 0 (all-negative? (rest lst)))" instead of "(all-negative? (rest lst))"
- Many people did not write check-expects correctly either missing the function name or the result
- Many people did not write a check-expect for the empty case

Q9:

- Many students were missing the second base case (empty? (rest lst))
- Many students used = to compare 2 symbols instead of symbol=?
- Many students tried to compare (first lst) and (identical? (rest lst)) which is an error as (first lst) is a symbol and identical? produces a bool
- Many students used (= (length lst) 1) as the second base case when they should use empty? (rest lst))
- Some students used disallowed functions like equal?
- Some students had incorrect recursive calls like (identical? (first lst)) or (identical? (first (rest lst))) instead of (identical? (rest lst))
- Some students compared a symbol and a (listof Sym) using symbol=?

Q10:

- Many students used = to compare 2 symbols instead of symbol=?
- Many students used (or ...) incorrectly, trying to consume symbols instead of booleans
- Many students forgot to check whether something is a symbol before trying to use (symbol=?)
- Many students did not correctly check the length of the list
- Many students tried to hard-code the possible values for a rank, instead of using comparison operators