

Instructions: Answer all questions and show your work. Each question is worth 10 points.

1. Given a function $f(x) = 17x - 30$, find the difference $f(2) - f(1)$.

$$f(2) = 17(2) - 30 = -4$$

$$f(1) = 17(1) - 30 = -13$$

$$f(2) - f(1) = -4 - (-13) = 9$$

2. What is the largest number of distinct, real roots the following function can have? Explain how you know.

$$f(x) = x^4 - 17x^3 + 3x^2 - 4$$

4 roots



Definition – a **Rubric** is a scoring guide that defines certain criteria (traits), and explicitly describes the performance characteristics or qualities that are required to achieve given scores for each criteria/trait.

Benefits of using a well-constructed assessment tool & grading technique

1. Make grading more consistent and fair
2. Aid students in assessing their own strengths and weaknesses by giving specific feedback on performance
3. Save time in the grading process (once a robust rubric is developed, grading is easy, with few judgment calls required)
4. Save time later: a well-designed rubric will mean fair grading, which means fewer student complaints!
5. If the same assessment questions and rubric are used in successive classes, student scores can be used to assess the effectiveness of new teaching strategies.

Do's and Don't's for Assessment Design and Grading

DESIGNING THE EXAM & GRADING SCHEME:

DO discuss with your course director BEFORE THE CLASS BEGINS the policies for: late homework assignments, missed exams, timing & procedure for returning assignments/exams.

DO ask colleagues to pre-take the question/exam before distributing it to real students. Find out how long it took for them to complete the test (expect real students to take longer), and ask for feedback on clarity of questions.

DO design a robust answer key (rubric) that can be applied to all answers. Begin design of your rubric when you initially write the question (imagine what answers may be), and revise it after collecting sample answers to the question.

DO consider two options of grading with answer keys: awarding points for correct answers/concepts or subtracting points for incorrect components.

DO consider using a rubric for more complex or open-ended questions. **DO** consider providing this rubric to students before the exam.

DO indicate next to each question on an exam how many points that question will be worth (it will be easiest to do this if you have already designed your rubric!). This will help students manage their time effectively.



GRADING THE EXAM:

DO use non-erasable ink, preferably a color different than that used by the students (green, purple, or red).

DO grade all answers to ONE question before moving on to the next question. You will be more objective. You will have the grading key memorized, and will move quickly!

DON'T look at student names, or try to identify "who wrote that answer?"

DO look through 8-10 answers (or more) before assigning any scores in writing, to be sure that your grading key seems to account for the range of student answers.

DO revise the answer key as you grade, if need be. **DO** skim all answers when finished, to be sure all still meet the standards of the final rubric.

DO provide written feedback to students in addition to a score, so that they can learn from their mistakes.

DO put checkmarks next to correct points when an answer or key are complex, to indicate portions of the answer that were done correctly.

DON'T get caught grading details; keep your focus on the true learning objectives for the course. (Read past spelling errors!)

DO be sure that the scores your rubric assigns agree with your opinion for what score that type of answer should receive. If not, revise your rubric to make it more or less stringent!

DO manage your time when grading—it will take time, but be efficient as well as rigorous. Follow the formula of your key/rubric. Keep feedback concise; **DON'T** try to explain the correct answer in your written feedback—instead, provide the answer key later! If a student's answer is off-base, write "please meet me to discuss", and follow up with the student to ensure they understand.

DO write notes to yourself about class performance as a whole (including what concepts many students miss) and discuss these with the course director. This may indicate that the exam question was not designed well or written unclearly, or that a new method for teaching these concepts may be more effective.

RETURNING GRADED WORK:

DO provide the answer key or rubric to the students when you return the exam (Even better: provide the rubric/expectations before the assessment takes place!)

DON'T pass back homework or exams in a way that will advertise individuals' scores to their peers. If need be, write the final grade on the back of the sheet.

References

"Effective Grading: A tool for learning and assessment," Barbara Walvoord and Virginia Johnson Anderson, a book published by Jossey-Bass (1998).

"First Day to Final Grade: A graduate student's guide to teaching," Anne Curzan and Lisa Damour, a book published by The University of Michigan Press (2000).

Allen, D. and Tanner, K. "Rubrics: Tools for making learning goals and evaluation criteria explicit for both teachers and learners." (2006) CBE-Life Sciences Education, 5: 197-203. <http://www.lifescied.org/cgi/content/full/5/3/197>



Steps to create a 2-dimensional rubric*

1. List the criteria or "traits" that may be considered in evaluation. Write these traits as nouns or noun phrases. Examples are below.
2. Prioritize these traits, and select the most relevant to your learning objectives (2-8 traits).
3. For each trait, construct a 2- to 5-point scale, which evaluates how well this trait is mastered. (4-point scale may be 1 =beginning, 2=developing, 3=accomplished, 4 =exemplary) For each scale level, define what must be demonstrated in the answer (or what is lacking in the answer) to attain that score.

Rubric Template

| Trait | Levels of increasing mastery | | | | |
|-------|------------------------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| | | | | | |
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Non-scientific example traits for a rubric: (<http://projects.edtech.sandi.net/staffdev/tpss99/rubrics/rubrics.html>)

For an Oral presentation, **traits may be:** voice projection, body language, grammar & pronunciation, organization

For a project on Persuasion **traits may be:** quality of argument, match of appeal to audience, organization & sequence

* Adapted from "Effective Grading: A tool for learning and assessment," by B. Walvoord and V. Johnson Anderson, pg. 69.