

Karen Grace's Not-So-Random Thoughts on Standards-Based Grading

Why is standards-based grading important for a secondary math class?

- We fall into a trap of allowing students to do assignments for points to get a passing grade, not for understanding.
- EOC's demand understanding
- Allows for differentiation – students that do well can go deeper into an area, those that need remediation have a chance to get help instead of moving on and getting more behind
- Many college math classes give grades on tests alone...this gives them a taste of that while having a safety net of being able to redo poor tests

What evidence do I have that this works and is good for student learning?

- I followed a group of students through intervention math for 3 years. The first two years I graded them using traditional grading, the third year I used standards-based grading.
- While you would think that because these students tend to not be good test takers that scores would be lower, actually they were much higher. Final grades were on average a letter grade higher. No grades were lower.
- Students were used to being able to turn in a bunch of assignments, get to a D- and go on to the next course with no understanding and less prepared to succeed in the next course. Standards-based demanded them to understand.
- If there was a group of students that you would worry about not doing assignments, you would think it would be these students, but actually I have more students doing and turning in work than before. It seems that they understand they have to learn it. They also feel relieved that there's no penalty for not finishing an assignment, so instead of rushing through it, they actually take their time on them. I don't worry about completion, I worry about understanding. I rarely have issues with students not doing work. If I do, I penalize their behavior, not their grade.

How do I implement it?

In intervention courses:

Excerpt from Syllabus

Evaluation of student learning will be done with the following guidelines:

1. Final grades will not be affected by non-academic factors. Those will be reported separately.
2. Only assessments that take place after learning is supposed to have occurred (“summative assessments”) will be used for grading purposes. Practice assignments will not factor into the student’s final grade.
3. Students will be allowed to redo or retake assessment work to allow them a chance to meet standards.
4. Grades will reflect the most recent learning. For example, if a student had scored a 2 on a standard, and later demonstrates an improvement in that standard to a 4, only the 4 will appear in the grade book.
5. All assignments will be graded on the 0 – 4 point scale below:

4 (100%)	3 (85%)	2 (70%)	1 (55%)	0 (0%)
The student demonstrates exceptional skills and knowledge above standard.	The student demonstrates proficiency with the standard, only making minor mistakes.	The student shows emerging progress toward meeting standard, but overall lack of understanding.	The student is making minimal progress toward meeting standard.	No evidence of Learning.

- Each unit covers 4-6 standards. About 2/3 of the way through the unit, I test students to see where they are at. This is a “1st take”. I tell them not to stress about it, but show me what you know and what you still need to work on. Then, we continue to cover material, or start a new unit. During the new unit, we take time to go back and re-visit things they struggled with. About 2/3 of the way through the next unit, we will test over the new standards (another “1st take”) and re-test over the old standards. See example trig assessment.
- I grade each section holistically. For example, I might have 4 problems and they missed all 4, but each was a sign error, so I give them a 3 because overall they understand the concept. Think partial credit, but by section instead of by problem.
- If students earn a 4 the first time around, they do not have to retake the standard. If they earn a 3, they only have to redo what they missed (as long as they hold on to their old test so I can see it). A 2 or less requires them to redo the entire section. Students are looking for improvement, not perfection. I do not penalize students if they score lower the second time.
- One problem is grading cumulative knowledge. Currently, I allow the final to take care of that. It is 10% of the overall grade and gives them another attempt at improving their score on some standards.
- For student reflections, I try to conference with each student when handing back their paper. I highlight things they did well or improved on, and pick something in each section needing improvement and we work on it. I have found if you just give them back a test with all low scores, they get frustrated and want to give up. But the conference helps them see that they have control and a chance to improve.

In AP Stat:

- Tests are not broken up by standard. I break them up when I grade them, grading one standard at a time. One problem may assess multiple standards, but typically each part addresses only one. Grades also come from quizzes and investigative tasks.
- To give a grade for a standard, I consider all grades they have received on that standard, putting the most weight on the most recent assessment and give a somewhat weighted average for the standard. Cumulative knowledge is measured because I penalize students if they score lower on a standard later in the course than they did at first.
- Students may redo any standard IF they have completed all homework aligned with that standard and corrected their test. For example, they cannot retake the Probability test if they did not turn in Ch 14-17 homework and hand me a corrected Probability test.

Example of AP Stat Test Score Sheet

I. Exploring Data: Bivariate Data (Unit 2)	test item #	Score /4
D. Exploring bivariate data (Describing patterns and departures from patterns)		
1. I can create scatterplots with appropriate variables (explanatory/response) and scales.	13a, 13d, 15a	
2. I can describe scatterplots using form, direction and scatter.	15b	
3. I can calculate and interpret correlation coefficients.	1-5, 11, 12b, 13b	
4. I can calculate least-squares regression line and interpret slope and y-intercept.	6-7, 12c, 14a, 15c-d	
5. I can calculate and interpret residuals and residual plots.	8-9, 13c, 15f	
6. I can describe the effect of outliers and influential points on regression analysis.	15f	
7. I can calculate and interpret the coefficient of determination.	10, 14b, 15e	
8. I can calculate and interpret predicted values using a least-squares regression line.	12d, 14c	

Example of Student Reflection Sheet

Standard 1

_____ I did well on this standard.

_____ I missed this standard because _____

Standard 2

_____ I did well on this standard.

_____ I missed this standard because _____

To improve my grade on any standards that I feel I scored low on I plan to:

_____ I will get help correcting my test before the re-test on November 2nd

_____ I will re-write my investigative tasks

_____ I will retake ch 7, 8, and/or 9 quizzes (circle the appropriate ones)

_____ I will re-read (or read) the chapters

_____ I will complete the homework problems I didn't complete before the test

_____ I will pay attention in class

_____ I will complete the homework for ch 10 that covers some of the same standards

_____ I will come see Mrs. Grace or another student for help

_____ Other _____

_____ I am pleased with my grade on these standards and will continue to review them before the cumulative test on Nov 2nd

To set up grade book:

- Set up Weighted Categories – 90% standards, 10% final exam, 0% practice (to keep track for monitoring, parent conferences, etc)
- In Infinite Campus, under “Instruction” go to “Admin” and “Assignment Marks”
Create a New Scale (you will be the only one that can see it)
Name it something you will remember (ex. Grace Standards) and under “Marks Detail” enter “4” for Score and 100 for percent earned. Check passing.
Continue, making a 3 an 85%, a 2 a 70%, a 1 a 55% and not passing, and a 0 a 0% and not passing. SAVE.
- Under assignments, enter the standard you are assessing. At the bottom under “Grading Tasks” choose the “standards” category, choose “Marks” for scoring type, choose your scale under “assignment marks” and enter “4” for total points. SAVE.
- Now you can enter a score from 0-4 and it will calculate it as the percents you choose instead of a 1 being 25%.
- I use the comments on grades when a student increases their score to keep track of what they had. For example, if Bob had a 1 and increased to a 3, I would change his grade to a 3, but enter 1 under the comment field. This is useful to help students see progress, to show parents a student’s progress (or lack of), and in general for you to see if students are improving.
- In AP stat where I keep track of many grades for a standard, I do this on a sheet outside of IC. Each standard gets its own sheet. I have seen it done in Excel, but I think it’s easier by hand. Only the weighted average for each standard goes in grade-book (too many grades to handle otherwise).

Advice for getting started:

- Choose one course at a time.
- Don’t get bogged down on the student reflection piece, while important, getting the logistics down will take time. At first, just print grade sheets so students can see what they’ve done (print the comments so they can see their improvements) and what they still need to work on.
- It sounds like a lot of work, but the grading is MUCH faster. The record keeping takes a little more time, but overall I find the workload to be about equal.
- Make your tests in a test generator like Exam View and choose questions that recalculate if possible. This will save you lots of time as you have to remake tests for low standards.
- Break standards apart when necessary. For example, you may want to test solving an inequality separately from graphing them.
- However, fewer is better. If you break standards apart too much, you will have a grading nightmare – too many and difficulty deciding which questions test which standards.

Name: _____ Class: _____ Date: _____

ID: A

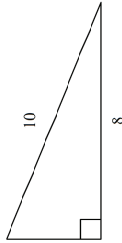
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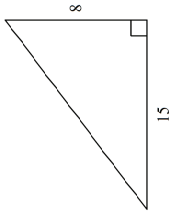
Trig Standards

D.2.c: Apply the Pythagorean Theorem and its converse to triangles to solve mathematical and real-world problems.

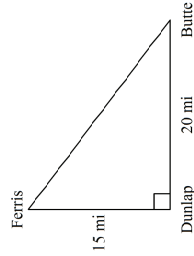
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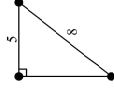
2.



3. Wayne used the diagram to compute the distance from Ferris to Dunlap to Butte. How much shorter is the distance directly from Ferris to Butte than the distance Wayne found?

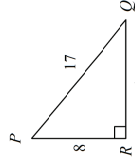


4. Lisa is landscaping a triangular area in her backyard. To the nearest foot, how much fencing will Lisa need to enclose the area?



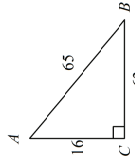
H.1.b: Find the sine, cosine, and tangent ratios of acute angles give the side lengths of right triangles.

5. Write the tangent ratios for $\angle P$.



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6. Write the ratios for $\sin A$ and $\cos A$.



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$\sin A =$ _____ $\cos A =$ _____

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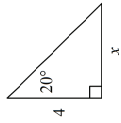
7. In this diagram, the ratio: $\frac{b}{c}$ is equivalent to which trigonometric expression?



- a. $\cos A$
- b. $\tan A$
- c. $\cos B$
- d. $\sin A$

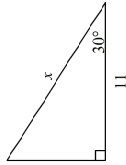
H.1.c: Use trigonometric ratios to find the sides of angles of right triangles.

8.



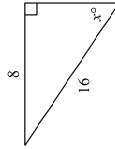
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9.



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10.

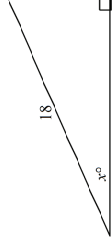


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11.



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H.1.c: Use trigonometric ratios to find the sides or angles of right triangles in real-world problems.

- 12. A forest ranger spots a fire from a 22-foot tower. The angle of depression from the tower to the fire is 20° . Draw a diagram to represent this situation.
 - a. To the nearest foot, how far is the fire from the base of the tower? Show the steps you use to find the solution.
- 13. Viola drives 170 meters up a hill that makes an angle of 8° with the horizontal. To the nearest tenth of a meter, what horizontal distance has she covered?
- 14. To approach the runway, a small plane must begin a 8° descent starting from a height of 1368 feet above the ground. To the nearest tenth of a mile, how many miles does the plane have to fly to reach the ground when it begins its approach? (hint: not the ground distance - the distance it FLIES).
- 15. An engineer must decide whether to build a road that climbs a hill or goes around it. To do so, he must determine the angle of elevation from horizontal ground to the top of the hill. To the nearest degree, determine the angle of elevation of this hill.

