

1. Overview.

The class is split into two teams which each send a representative to the board for each round of play. The teams' representatives take turns in successive rounds selecting problems from a deck of problems prepared by the instructor. The problems are on one side of the cards and the point value and possibly a general topic statement like "derivatives" or "graphing" for the problems are on the other. The selection of a problem in each round is based on the point value and optional topic statement. Once the problem is selected the instructor waits until the students are ready and then reads the problem in a clear voice. The first of the two people at the board to arrive at a correct answer that they can justify is awarded the points for the problem and the points are also added to his team score. The other person at the board receives ten points less than the stated value of the problem, to a minimum of zero points. Problems are typically worth 5, 10, 15, 20, or 25 points with harder problems being worth more points. At the end of the class period the team with the higher total is awarded ten points each.

2. Details.**(a) Verbal Help.**

The members of either team may give their representative verbal help so long as this help is not the answer to the problem or blatantly the next step of the problem. If, in the instructor's opinion, a given verbal statement is the exact next step or the answer and either person at the board heard the statement then he should call a foul on the team that the commentary is a member of. This verbal help must be in a clear voice loud enough to be heard by both players at the board. In the event of a problem with language or accent the instructor should repeat the comment for the benefit of those that misunderstand it.

(b) Printed and Written Help.

The people at the board may use their own class notes to help them at the board. They may not borrow other people's notes. Any form of access to others notes is considered a foul. They may use any book they bring to class themselves. They may use a copy of the textbook for the class no matter who owns it so long as marginal notes in the book do not constitute "notes" in the opinion of the instructor.

(c) Ties.

In the event that both teams have the same score at the end of the class then the instructor should award either five points to everyone on either team (the nice option) or no points to anyone on either team (the pressure option). The instructor should declare the tie resolution he intends to use at the beginning of the semester.

(d) Impossible Problems.

In the event that neither team's representative at the board seems to be making progress even with the help of their seated colleagues the instructor should declare

a time limit (1-3 minutes) after which the problem is over no matter what. In the event that no correct answer is derived by the end of such a time limit the instructor should award the players a number of points less than the worth of the problem that is consistent with their progress. This amount need not be the same for both players.

(e) **The End of the Class.**

In the event the class is over before a problem is completed then the instructor should treat that problem as an impossible problem whose time limit has run out. If it does not inconvenience the next group that needs the room the instructor may be slightly flexible about the time limit.

(f) **Instructor Commentary.**

The instructor cannot commit a foul. If the instructor wishes to say anything he may no matter how grossly unfair it seems. The instructor should not show favoritism or be intentionally cruel or unfair. The instructor's inability to foul is a tool that should be used only to advance learning. If one person at the board has started on a cumbersome or useless calculation the instructor might suggest to him that he is wasting his time. If both players are having trouble getting started or are stuck then the instructor may suggest a first step or next step. If the instructor sees an obvious error and none of the students have cried out "you made a mistake" or "two and two is five?" then the instructor might take it upon himself to say "oops".

(g) **Appeals.**

In the event that anyone feels something utterly unfair has happened he may object and the instructor should give him a short period of time in which to state his objections. The instructor should then explain his opinion on the matter and, if the student has convinced him an injustice exists, should make amends by invalidating problems, awarding or deleting points, or giving an additional problem.

(h) **Taking Turns.**

In any given class period a student may come to the board only once unless everyone on his side has also had a turn. This rule holds even if a person's turn is cut short by a foul. In the event that no one volunteers the instructor should devise a method of "randomly" selecting a participant. At the beginning of a session of play the first choice of problem goes to the team that produces a volunteer first. Choice alternates thereafter.

(i) **Fouls.**

In addition to yelling out an answer or the exact next step (and being heard) or passing your representative class notes other than his own or a book, other than the text, that he did not bring to class himself the referee may declare any action he feels to be unfair to be a foul. If the instructor declares a foul then the team that did not commit the foul and their representative are awarded the points for the problem being worked as if their representative had correctly completed it.

(j) **Hints.**

A problem may have a hint with a specified point cost. The point value of the problem is then reduced by the cost of the hint if the hint is given. The hint may be given only if both players at the board request it.

3. **Student Derived Rules.**

(a) **Sandbagging.**

The people at the board can steal one another's work freely. This is called sandbagging. As it is hard to copy fast enough to pass another person this rule serves mostly as an equalizer. A player may make his notation as cryptic as he wishes so long as he can justify it to the instructor at the end but this is seldom beneficial.

(b) **Blocking.**

Either or both teams may send a second person to the board to block the other players line of sight.

- i. A blocker may use only his own body or an object no larger than a loose leaf notebook to block lines of sight.
- ii. If two blockers are at the board they may not touch one another. Intentional touching is a foul.
- iii. A given person may only block once in a given class period unless everyone else on his side has also blocked.
- iv. Blockers may not speak while they are blocking.
- v. Players may verbally repeat anything they see on the board though supplying context may be a foul. In particular players may relay information around a blocker.

(c) **Space.**

All the players a team has at the board must stay on their own side of the board. Physical interference with the other team is a foul. Failure to stay on your own side is not a foul unless it is excessive in the opinion of the instructor. The instructor should politely remind people to stay on their own side.

(d) **Problem Card Security.**

If anyone but the instructor sees the side of a problem card that contains a problem the problem is invalidated.

(e) **Running the Deck.**

In the event that a class completes a problem deck, something that should be an unusual event, the instructor should increase the victory bounty by five points.

(f) **Impossible Problems that are the Instructor's Fault.**

If the problem assigned by the instructor is completely impossible because of an oversight or act of incompetence on the part of the instructor then the problem is invalid and the players at the board may go again later in the class period if they wish.

(g) **Extended Appeals.**

If a mistake or injustice is not noticed by the end of the class period then no compensation is ever made. If there is not time to hear an appeal then the instructor should extend it until the next sports day (not the next class period).

(h) **Picking Teams.**

People need not sit in the same location on each sports day and are thus free, to some degree, to choose their team. In the event that one team (side of the room) has a winning streak that causes the victory bonus to fall quite unevenly on many students then the instructor may move some students around to equalize things.

(i) **Score Keeping and Late Arrivals.**

At the beginning of each sports day the instructor should circulate a team roster for each team. Team members put their names on the roster and mark any points they earn on the roster. At the end of the class period the instructor should clearly mark the winning teams roster "victors" so that he will remember who receives the victory bonus. Any student's name that appears on both teams rosters receives no points at all for that day. A student that arrives more than ten minutes late to class may not add his name to the team roster unless he goes to the board to work a problem.

(j) **Calculators.**

The instructor should declare at the beginning of the semester if he allows calculators. In the event that calculators are allowed then a person may not use someone else's calculator, only their own. The instructor should either make sure problems are written so that calculators do not give an excessive advantage or should clearly mark a problem "calculator" or "graphing calculator". Students should not be required to work a marked problem they do not have an adequate calculator for.

(k) **Checking.**

The team that does not have choice in a given round need not produce a volunteer until after they hear the point value, and possibly topic, of the problem. This compensates for not having choice. The macho and the brilliant will sometimes come up before they hear the point value or topic.

(l) **Priority of Volunteers.**

The first volunteer becomes his team's representative at the board and a person may not "unvolunteer". If the referee is selecting a victim due to lack of volunteers but has not completed the process then a player may volunteer at any time before the selection process is completed. Random players are often unprepared so such eleventh hour volunteering is often a good tactical move.

(m) **Deferring Choice.**

A representative of the team that has choice may defer to his opponent and allow the opponent to choose the problem.

(n) **New Rules.**

In the event a situation arises that indicated a flaw in the rules or which suggest a

beneficial extension of the rules then the instructor may make a summary ruling or give options and request a majority or other type of vote. In general the instructor should encourage students to create new rules that enhance the game. Excellent additions to the rules may be rewarded with five points to the student's personal score.

4. **Optional Rules.**

(a) **Tag Team Play.** by Ann Stanley.

In this play variant a student draws a small box on the board. In the event the student is stuck he puts a check or "X" in the box and is replaced by another student if one is willing to volunteer. Students may verbally encourage their teams representative to let them come up. A student that retires under the tag team rule receive no points.

i. **Priority Effects.**

The instructor should decide if going to the board and resigning uses up a student's turn at the board.

(b) **Choosing Teams.**

If the teams need to be reshuffled to equalize an inequality then the instructor may select two captains and allow them to choose teams.

(c) **Random Problem Selection.**

The instructor may require students to draw problems at random from the deck. In this case rule 3(k) should be deleted.