Math 171
Statistical Decision Making Project 1

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Goal: After completion of this project you will better understand 'curving' grades.

Background: A curve breaks up grades proportionally, for instance we may break up the grades as follows:
This neatly distributes the grades on an assignment. Additionally, we can calculate the cut- offs for each score by calculating the relevant percentiles of the given the data. For example, the 70th percentile is the lowest score that yields B, while the 30th percentile is the lowest score which results in a C.

Instructions: Use the test scores below to determine the score ranges necessary to obtain each grade, using the same proportions as listed above.
90 82 74 60 50 92 88 70 68 32 94 86 71 67 83 96 85 72 62 84 90 80 78 64 84 91 81 79 69 75 92 81 79 69 73 92 87 77 61 74 93 88 76 62 74 93 89 75 78 76

Grade	**A**	**B**	**C**	**D**	**F**
Proportion	**10%**	**20%**	**40%**	**20%**	**10%**

Grade	A	B	C	D	F
Proportion	10%	20%	40%	20%	10%
Score Range	83.2-96%	70.4-83.2%	57.6-70.4%	44.8-57.6%	32-44.8%

Answer the following questions. Your answers should be about a paragraph in length.

1. **Using the chart above, what grade would a student who scored an 82 receive? Do you think this is fair to that student?**
    a. The student would receive a B because an 82% falls between 70.4%-83.2% which is the range for grades that fall into the 70th percentile, a B. We do think that this would be a fair grade for the student as they would be receiving a B on the test if the curve did not exist in the

first place. It also falls on the lower side of an uncurved B, meaning that it is not high enough to even be considered close to an A.

2. **Now suppose that we collected data for all of the sections of Statistics and the score ranges were given in the following table.**

Grade	**A**	**B**	**C**	**D**	**F**
Proportion	**10%**	**20%**	**40%**	**20%**	**10%**
Scores	**88 — 100**	**77 — 88**	**60 — 77**	**55 — 60**	**0 — 55**

What does this suggest about the fairness of the grade in the previous problem?

a. Both score ranges place the student's grade of an 82% within the 70th percentile of grades scored meaning that they would receive a B irregardless of which curve is used. This helps to further prove that the grade (of a B) that the student received in the previous problem is fair. It has been proven fair by two different curves as well as the fact that it would be considered a B without a curve.

3. **In the scheme above, 10 % of students are destined to fail. If you were enrolled in such a class, how would this make you feel? Specifically, discuss this in relationship to your attitude toward the material covered and your fellow classmates. Are you more, or less, likely to be concerned with material being covered? Are you more, or less, likely to help a classmate? What are some pros and cons of using this scheme?**
    a. This type of system would increase pressure on students and make them increasingly more nervous because no matter how well they do on a test, if they fall in the 10th percentile they will fail the course. Our group would also be especially anxious since it requires you to score as high as possible. We would be more concerned with material because of how high the stakes are with the need to score as high as possible. We would also be less likely to help a classmate because the more students that do better than you, the lower grade you will get because you will be placed in a lower percentile in the overall grades. Some pros are that it would make the class more competitive and students would be more willing to work hard and study more. Many of the cons revolve around fairness to the

students; they might get significantly lower grades through this system than a normal one simply because their classmates do better than them.

4. **Consider the typical decimal grading system, where the grades are determined only by the scores.**

Grade	**A**	**B**	**C**	**D**	**F**
Scores	**90 — 100**	**80 — 90**	**70 — 80**	**60 — 70**	**0 — 60**

In this scheme, there is no set percentage of students who must fail, however, anything less than 60 is given the same grade. Is it fair to give a student who scored 59 the same grade as the student who scored 13? What happens if everyone scores 92? How would you feel about enrolling in a class that required a minimum grade to pass? Specifically, discuss this in relationship to your attitude toward the material covered and your fellow classmates. Are you more, or less, likely to be concerned with material being covered? Are you more, or less, likely to help a classmate? What are some pros and cons of using this scheme?

a. It is fair that a student who scores a 59 gets the same grade as one who scores a 13 because neither student showed that they know enough of the material well enough to have mastered it; therefore neither should pass despite the large range between the two grades.If everyone scores a 92, then they would all get A's which is an accurate representation of how well they know the material. The requirement of having a minimum grade to pass is nothing out of the ordinary, because that is the way the grading system is now. It would make learning the material less stressful because you would know that you only have to learn a certain amount to pass. However, this is a disadvantage, because you would not be willing to participate to learn more. You would also be more likely to help out a classmate because the grade they receive has no impact on the grade that you get. The main pro is that this system accurately represents how much of the material students know and gives them the appropriate grade for it. However, students are not as motivated to study as they would be under the grading system described in number 3.

5. **The previous two questions are meant to get you thinking about how you are graded in our course. Having now thought about the options presented in those questions, would you prefer to be enrolled in a course which grades on a curve, or would you prefer to be enrolled in a course which uses a grade scale similar to the one found in question 4? Why do you feel this way?**
    a. We said that we would rather be enrolled in a course that grades on a curve. We feel that the grading scale gives you more room to make mistakes without the stress of automatically failing. It also helps account for any problems that a majority of the class misses on a test so they don't unfairly bring students' grades down.