Last Name\_\_\_\_\_\_\_\_\_\_\_\_\_ First Name\_\_\_\_\_\_\_\_\_\_\_\_\_

**Math 1070**

**Midterm Examination I**

1. The exam will take 50 minutes

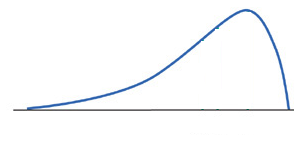
2. If you find the space is not enough, you might write in the back, but please specify the question number.

3. Problem 1-5 are multiple choice questions (5 points each, ONE answer merely)

4. Problem 6-10 are FREE answer questions. (15 points each)

5. Total is 100 points, Good Luck!

1. Look at the following density curve, which would be larger, the Median or the Mean?



**a. Median is larger**

b. Mean is larger

c. They are the same

d. None of the above

2. Scores on Georgia State University exam are normally distributed with a mean of 73 and a standard deviation of 11. Using the 68-95-99.7 rule, what percentage of students score above 95?

**a. 2.5%**

b. 5%

c. 16%

d. 32%

3. This is a standard deviation contest. Which of the following sets of four numbers has the

smallest possible standard deviation?

a. 7, 8, 9, 10

**b. 5, 5, 5, 5**

c. 0, 0, 10, 10

d. 0, 1, 2, 3

4. A survey is conducted on students taking a statistics class. Several variables are measured in the survey. Which of these variables listed below is not quantitative?

a. the number of credit hours taken during the quarter

**b. the gender**

c. the parents annual income

d. the High School GPA

5. The following histogram represents the distribution of acceptance rates (percent accepted) among 25 business schools in 2004. In each class interval, the left endpoint is included but not the right, so the class intervals are 10 ≤ rate < 15, 15 ≤ rate < 20, etc.



The number of schools with acceptance rates between 20% and 40% is

a. 8.

b. 13.

**c. 18**.

d. 11.

Use the following information to answer questions 6-8

“Recruitment”, the addition of new members to a fish population, is an important measure of the health of ocean ecosystems. Here are data on the recruitment of rock sole in the Bering Sea from 1980 to 1981.

|  |  |
| --- | --- |
| year | Sole |
| 1980 | 14 |
| 1981 | 14 |
| 1982 | 13 |
| 1983 | 22 |
| 1984 | 18 |
| 1985 | 18 |
| 1986 | 28 |
| 1987 | 47 |
| 1988 | 17 |
| 1989 | 11 |

6. Make a stemplot to display the distribution of yearly rock sole recruitment, and specify the center and the spread.

1 1344788

2 28

3

4 7

Center: 17.5 (median)

Spread: 11-47

7. Find the mean and median for the rock sole recruitment.

Mean: 20.2

Median: 17.5

8. Find the standard deviation for the above rock sole data.

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 14 | -6.2 | 38.44 |
| 14 | -6.2 | 38.44 |
| 13 | -7.2 | 51.84 |
| 22 | 1.8 | 3.24 |
| 18 | -2.2 | 4.84 |
| 18 | -2.2 | 4.84 |
| 28 | 7.8 | 60.84 |
| 47 | 26.8 | 718.24 |
| 17 | -3.2 | 10.24 |
| 11 | -9.2 | 84.64 |

Then, adding up the third column, we get

So,

The following description accounts for questions 9-10.

The distribution of the actual weights of some chocolate bars is normal with a mean of 8.1 oz. and a standard deviation of 0.1 oz. A chocolate bar is considered underweight if it weighs less than 8.0 oz. The top 2.5% of the distribution is regarded as overweight.

9. To be labeled as overweight, how heavy does a chocolate bar have to be?

Solution: We are looking for a point “area to the right” of whom is 2.5% or 0.025.

We look for the corresponding z on standard normal distribution, whose “area to the right” is also 0.025.

*Attn that, we should look for 0.975 on the chart, since all the four decimal numbers shown on the chart are “area to the left”.*

From Table A, we know

Hence,

In conclusion, in order to be labeled as overweight, a chocolate bar has to be at least 8.296 oz.

10. How should the chocolate bar wrappers be labeled so only 1% of bars produced are underweight, while at the same time only 1% of bars produced are overweight?

The question asks for two points, s.t.

where .

Hence, look for ’s such that

.

According to Table A,

We have:

.

Hence,

and