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Math 132 - Fall 2001
Sections 2 and 3

EXAM 3

For this exam you may use a calculator and a note card or one-half sheet of notebook paper with notes on it. No other books or notes are allowed.

Each question is worth 8 points unless otherwise indicated. 100 points possible.

1. Suppose you want to estimate how many fish there are in a pond. You capture 225 fish, tag all of them, and put them back into the pond. A week later you return to the pond and capture 65 fish. You find that 15 of them are tagged. What is your estimate of the total number of fish in the pond?

2. One winter week the City of Madison had these high temperatures:

8, 15, 0, 6, 12, 15, 21

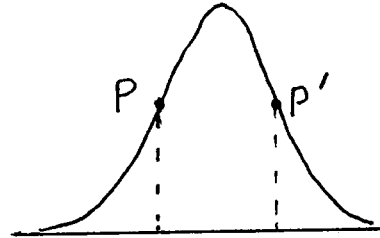
Find the **standard deviation** of these data values.

3. Suppose a computer password must have exactly 5 characters, chosen from the 26 letters of the alphabet and the digits 0 through 9. A character cannot be repeated. The password must start with an alpha character and the alpha characters and digits must alternate. Write an expression for the number of possible passwords that meet these criteria.

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4. Suppose you toss two dice, a white one and a red one. What is the probability that the sum of the dots showing on the top faces is **not equal to 8**?
5. If you draw a card from a well-shuffled regular deck of 52 playing cards and then draw a second card without replacing the first one, what is the probability **both cards are hearts**?
6. The weight in pounds of girls 7 years old is approximately normally distributed with mean equal to 48.5 and standard deviation equal to 3.6. Ann is 7 years old and weighs 45 pounds. The weight in pounds of boys 11 years old is approximately normally distributed with mean equal to 72 and standard deviation equal to 6.5 pounds. Bob is 11 years old and weighs 65 pounds. **Which child, Ann or Bob, has a lower weight compared to her/his age group? EXPLAIN HOW YOU KNOW THIS!**

7. In the normal curve in the figure to the right, P and P' are the inflection points. For the normal distribution modeled by this curve, find the:

- a) average (mean)
- b) median
- c) standard deviation
- d) first quartile



8. You find out that 2500 students take a college entrance exam and the scores are approximately normally distributed with a mean of 52 points and a standard deviation of 11 points.

Give an estimate of the **number of students who scored 74 points or higher**. **SHOW WORK.**

9. Suppose a random sample of $n = 7056$ children is to be chosen for a survey. Assume that a child chosen at random is equally likely to be a boy or a girl. Find the probability that the number of boys in the sample is less than 3570. **SHOW WORK.**

THIS PAGE IS MULTIPLE CHOICE. 4 POINTS EACH.

10. A national achievement test for 5th graders resulted in a mean of 142 and a standard deviation of 30. Which one of the following conclusions is the most plausible?

- a) Almost all the scores were between 112 and 172.
- b) Less than half of the scores were between 112 and 172.
- c) About half of the scores were between 132 and 152.
- d) The range of scores was approximately 60 points.
- e) About 95% of the scores were between 82 and 202.

11. The average of a data set of 11 numbers is 12. The minimum number is 2. Which one of the following could be a possible value for the maximum of the numbers in the data set?

- a) 8.3
- b) 12
- c) 13
- d) 15
- e) none of the above numbers could possibly be the maximum for this data set.

12. How can you find the interquartile range for a set of data values?

- a) Subtract $\mu - \sigma$ from $\mu + \sigma$.
- b) It equals 6σ .
- c) The answer is the middle 50% of the data values.
- d) Calculate Quartile 3 minus Quartile 1.
- e) None of the above is correct.

13. (10 points) Use this frequency table for the following questions.

score	3	4	5	6	7	8	9	10	11	12	13
frequency	2	1	1	3	3	4	0	1	2	1	1

- Find the **mean** (average) of this data set.
- Find the **median**.
- Find **Quartile 1**.
- Sketch a **Box-and Whisker Plot** for this data, labeling it completely.

14. (6 points) Suppose you have any data set whatsoever. Then you add 3 to each value in the set. Answer the following questions:

- How does the median change?
- How does the mean (average) change?
- How does the standard deviation change?

End of exam.

