

Math 102: Section 3

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Exam 2

Directions: Write directly on this exam. Use the back of the page if you need more room. Use a calculator. Express all solutions to at least three significant digits. Answer all questions to the best of your ability. Circle your final solution if applicable. You are free to use any resources you can find to aide you in completing this test except other people. **If you consult with others about questions on this test, you are cheating. Those caught cheating will receive a 0 on this test and their names will be submitted to the honor code office.**

Questions 1-10 are based directly off the homework.

1. (8 pts.) You deposit \$3481 in mutual fund with a guaranteed APR of 7.3%.

i) Calculate your total return after 1 year if interest is compounded annually.

ii) Calculate your total return after 1 year if interest is compounded monthly.

iii) Calculate your total return after 1 year if interest is compounded bi-weekly (every other week).

iv) Calculate your total return after 1 year if interest is compounded continuously.

2. (6 pts.) You take out a mortgage of \$300,000 with a fixed APR of 6.5% for 30 years.

i) Calculate your monthly payments.

ii) Determine the total amount you pay over the term of the loan.

iii) Determine how much of the total payment over the loan term goes to principal and how much to interest.

3. (3 pts.) Use the Pie Chart on page 288, and given that the total federal receipts in 2003 were $\$1.782 \cdot 10^{12}$, calculate the total amount of money the government received from income taxes.

4. (5 pts.) Describe how you would apply the five basic steps of a statistical study, as outlined in the lecture notes, to the following issue

You wish to know the average age of students at BYU.

5. (25 pts.) You desire to know the distribution of grades on the Biology 100 final. Of the 1245 students taking the course, you randomly sample 45 and find their grades on the final to be

B D C A C C A F C D B D C A C F C A B A C B F
C D B C D A B C A B B D F C C D A C B A B A

i) Create a complete frequency table for this set of data (include relative and cumulative frequencies).

ii) Make the identification $A=4$, $B=3$, $C=2$, $D=1$, $F=0$ and determine the average grade in your sample.

iii) Make a bar graph showing the relative frequency of grades.

iv) Make a Pie chart for the relative frequency of grades.

v) Make a line chart for the cumulative frequency of grades (Identify each point on the chart with the bin corresponding to A's, B's, etc.)

6. (30 pts)

Specimens of three different types of rope wire were selected, and the fatigue limit (MPa) was determined for each specimen, resulting in the accompanying data:

Type 1:

350 350 350 358 370 370 370 371 371 372 372 384 391 391 391

Type 2:

350 354 359 363 365 368 369 371 373 374 376 380 383 388 392

Type 3:

350 361 362 364 364 365 366 371 377 377 377 379 380 380 392

i) Find the mean, median, mode, and range of each data set

ii) Find the five number summary for each data set

iii) Find the standard deviation for each data set

iv) Construct a binned bar graph for each data set, and compare and discuss the three data sets in terms of their center and variation.

Hard Problem: (Extra Credit)

7. (10 pts.) You want to retire in 23 years. You would like to save $\$2 \cdot 10^5$, 45 years from now. If you are currently saving 15% of your total income each year, will you achieve your goal if you make \$40,000 a year currently, are receiving a 5% raise each year, and are depositing your money in a bank account with 3% interest compounded annually?