

NAME:

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DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MTH23

Quiz 4 Sample

Instructions

Do all problems. If necessary, use additional paper to write your solutions. Label your answers clearly. To receive credit, you must show all your work. For each problem, much partial credit will be given for simply writing the correct formulas needed to solve it. You may refer to a single letter-size page of notes that you bring with you, as well as the attached tables. You may use a calculator or laptop to help with calculations. Use the proper symbols for all statistics.

1. (10 points) x is a random variable with normal distribution, having $\mu = 24$ and $\sigma = 4$. What are the z -scores for trials where $x = 12$ and where $x = 30$?
2. (30 points) For any trial, using x from problem one, what is the probability that x is between 16 and 20?
3. (30 points) A random variable x has a normal distribution with $\mu = 10$ and $\sigma = 6$. Random samples of size $n = 8$ are taken of x giving \bar{x} . Is the distribution of \bar{x} over all samples approximately normal? What is the distribution mean of \bar{x} ? What is the standard deviation of \bar{x} ?
4. (30 points) A company making microwave ovens wants to offer a guarantee that, for the time of the guarantee, they will repair or replace any oven that fails. Random variable x , the lifetime of a microwave oven, has mean $\mu = 3$ years, and standard deviation $\sigma = 0.5$ years. What should the time of the guarantee be for the company to expect 5% of the ovens to fail in that period?