

**Math 153 - Test 3a**  
April 25, 2013

Name \_\_\_\_\_

Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations where necessary.

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1. (4 points) A *USA Today* survey found that 83% of government employees use email. In a government agency department of 40 people, what is the probability that fewer than 35 people use email?

2. (4 points) Lifetimes of wristwatches are normally distributed with mean 25 months and standard deviation 5 months. How long should a wristwatch last if it is to outlive 99% of all wristwatches?



6. (2 points) What is the “magic number” for the sample size in the Central Limit Theorem that describes when a sampling distribution will be approximately normal?

7. (4 points) A survey of 50 first-time white-water canoers showed that 23 did not want to repeat the experience.

(a) Find a 90% confidence interval estimate for the true population proportion of canoers who did not wish to canoe the rapids a second time.

(b) A rafting company has approximately 872 customers per year. If the company prints special brochures to market to repeat customers, what is the minimum number of brochures it should print each year?

**Math 153 - Test 3b**  
April 25, 2013

Name \_\_\_\_\_

Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations where necessary. This portion of the test is due Tuesday, April 30. You must work individually on this test.

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1. (9 points) A *USA Today* survey found that 21% of Americans watch fireworks on July 4. A random sample of 200 Americans is selected.

(a) What is the probability that at least 50 Americans in the sample watch fireworks?

(b) In samples of size 200, what is the mean number of Americans who watch fireworks? What is the standard deviation?

(c) In a sample of size 200, what are unusually small and large numbers of Americans who watch fireworks?

2. (7 points) The numbers of daily passengers on an express bus are normally distributed with mean 48 and standard deviation 3. On any given day, what is the probability that an express bus has more than 55 passengers or fewer than 43 passengers?



6. (9 points) At a certain hospital, there are an average of 210 low-birth-weight babies born each year.

(a) Find the mean number of low-birth-weight babies born per day.

(b) On any given day, what is the probability that more than one low-birth-weight baby is born?

(c) Is it unusual to have more than one low-birth-weight baby born at the hospital on any given day?

7. (7 points) Yearly individual consumption of meat is normally distributed with mean 218.4lb and standard deviation 25 lb.

(a) In a sample of 40 individuals, find the probability that the mean meat consumption is greater than 224 lb.

(b) What is the probability if the sample size is changed to 400?

8. (10 points) One number is selected from each box.

1	5	6
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4	8
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(a) List all possible samples and find the range of each sample.

(b) Summarize the sampling distribution of ranges in a probability distribution table.

(c) Find the mean of the sample ranges.

(d) Find the population range.

(e) Do the sample ranges target the population range? Explain.

9. (6 points) In a random sample of 35 U.S. cities, the mean growing season was 190.7 days. Assuming the population standard deviation is 54.2 days, find a 95% confidence interval estimate for the true mean growing season.

10. (8 points) Suppose you wish to estimate the mean number of chocolate chips per cookie for a large national brand. How many cookies would have to be sampled to estimate the true mean number of chips per cookie within 2 chips with 98% confidence? Assume that  $\sigma = 10.1$  chips.