Name: _____

Math 203: Contemporary Mathematics

Chapter 11 test, version (a)

Thursday, April 9, 2009

60 points

Instructions:

1. This test has 4 sheets of paper, 5 pages (counting the front and back of this sheet as two pages), and 3 questions. Please check that you have all of the pages.
2. Read each question carefully. If you have any questions, please ask.
3. Answer all of the following questions clearly and completely. Justify all of your answers. Most of the points you receive will be based on the accuracy, completeness, and clarity of your responses. Use full sentences, and avoid saying things that are untrue, ambiguous, or nonsensical.
4. You may use a calculator for this test, but you may not use a book or any notes.
5. Give your answer to each question completely and clearly in the space provided. You may use the back of the test pages for scratch work; however, if you want this work to be considered, please make note of it in the space provided for the question.
6. Erase or cross out work you do not wish to be graded.
7. You have 25 minutes to complete this test. Good luck!

Table 11.1: Area under the standard normal distribution curve between a and b.

		b												
		3.0	2.5	2.0	1.5	1.0	0.5	0.0	−0.5	−1.0	−1.5	−2.0	−2.5	−3.0
	−3.0	0.9974	0.9925	0.9760	0.9319	0.8400	0.6902	0.4987	0.3072	0.1574	0.0655	0.0214	0.0049	0.0000
	−2.5	0.9925	0.9876	0.9711	0.9270	0.8351	0.6853	0.4938	0.3023	0.1525	0.0606	0.0165	0.0000	
	−2.0	0.9760	0.9711	0.9546	0.9105	0.8186	0.6688	0.4773	0.2858	0.1360	0.0441	0.0000		
	−1.5	0.9319	0.9270	0.9105	0.8664	0.7745	0.6247	0.4332	0.2417	0.0919	0.0000			
	−1.0	0.8400	0.8351	0.8186	0.7745	0.6826	0.5328	0.3413	0.1498	0.0000				
	−0.5	0.6902	0.6853	0.6688	0.6247	0.5328	0.3830	0.1915	0.0000					
a	0.0	0.4987	0.4938	0.4773	0.4332	0.3413	0.1915	0.0000						
	0.5	0.3072	0.3023	0.2858	0.2417	0.1498	0.0000							
	1.0	0.1574	0.1525	0.1360	0.0919	0.0000								
	1.5	0.0655	0.0606	0.0441	0.0000									
	2.0	0.0214	0.0165	0.0000										
	2.5	0.0049	0.0000											
	3.0	0.0000												

Table 11.3: Standard normal distribution areas.

z	Area above interval 0 to z	z	Area above interval 0 to z	z	Area above interval 0 to z
0.1	0.0398	1.1	0.3643	2.1	0.4821
0.2	0.0793	1.2	0.3849	2.2	0.4861
0.3	0.1179	1.3	0.4032	2.3	0.4893
0.4	0.1554	1.4	0.4192	2.4	0.4918
0.5	0.1915	1.5	0.4332	2.5	0.4938
0.6	0.2257	1.6	0.4452	2.6	0.4953
0.7	0.2580	1.7	0.4554	2.7	0.4965
0.8	0.2881	1.8	0.4641	2.8	0.4974
0.9	0.3159	1.9	0.4713	2.9	0.4981
1.0	0.3413	2.0	0.4772	3.0	0.4987

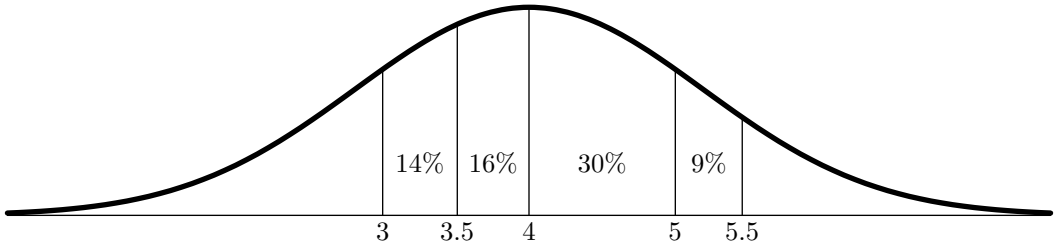
Question 1. (23 points.) Suppose measurements are taken from a population that has a standard normal distribution. Find the percentage of measurements that are in the specified interval.

(a) (7 points.) Between 0 and 1.6.

(b) (7 points.) Between -0.4 and 0.

(c) (9 points.) Between 1.1 and 2.7.

Question 2. (10 points.) Suppose the following figure represents the distribution of body lengths (in inches) from a large population of a certain species of hamster.



(a) (5 points.) What percentage of the hamsters in this population are between 4 and 5 inches long?

(b) (5 points.) What percentage of the hamsters in this population are between 3.5 and 5.5 inches long?

Question 3. (27 points.) The height of adult men in the United States is approximately normally distributed, with a mean of 69 inches and a standard deviation of 3 inches.
(*Source:* `http://investing.calsci.com/statistics.html`)

(a) (8 points.) Find the z-scores of each of the following heights of American men: 72.6 inches and 76.8 inches. (In other words, how many standard deviations above or below the mean is each of these values?)

(b) (12 points.) What percentage of American men are between 72.6 inches and 76.8 inches tall? Use the z-scores you found in part (a) and Table 11.3.

(c) (7 points.) According to the United States Census Bureau, there are approximately 109,500,000 males age 18 and over in the United States. About how many adult men in the United States are between 72.6 inches and 76.8 inches tall?

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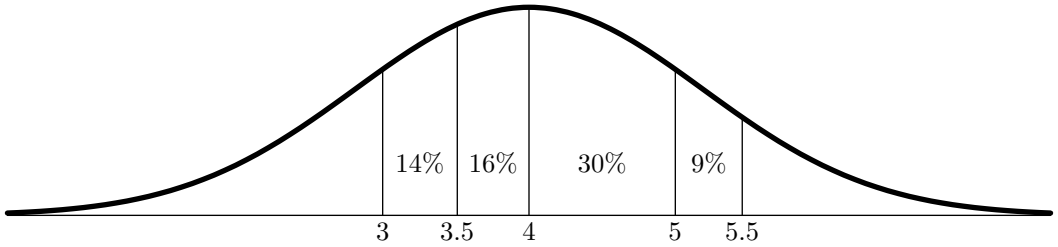
Question 1. (10 points.) Suppose the following figure represents the distribution of body lengths (in inches) from a large population of a certain species of hamster.



(a) (5 points.) What percentage of the hamsters in this population are between 3 and 3.5 inches long?

(b) (5 points.) What percentage of the hamsters in this population are between 3 and 5 inches long?

Question 2. (23 points.) Suppose measurements are taken from a population that has a standard normal distribution. Find the percentage of measurements that are in the specified interval.

(a) (7 points.) Between 0 and 2.2.

(b) (7 points.) Between -1.8 and 0.

(c) (9 points.) Between -0.2 and 1.4.

Question 3. (27 points.) Scores on the SAT examination (calculated as the total of the critical reading, mathematics, and writing scores) are approximately normally distributed. In 2006, the mean score among college-bound seniors was 1518 and the standard deviation was 308.
(*Source:* `http://www.collegeboard.com/prod_downloads/highered/ra/sat/SATPercentileRanksCompositeCR_M_W.pdf`)

(a) (8 points.) Find the z-scores of each of the following SAT scores: 1641 and 1857. (In other words, how many standard deviations above or below the mean is each of these values?)

(b) (12 points.) What percentage of SAT examination takers in 2006 scored between 1641 and 1857? Use the z-scores you found in part (a) and Table 11.3.

(c) (7 points.) A total of 1,376,745 college-bound seniors took the SAT examination in 2006. About how many test-takers scored between 1641 and 1857?