

Name: _____

Math 203: Contemporary Mathematics

Chapter 1 test, version (a)

Thursday, January 22, 2009

60 points

Instructions:

1. This test has 4 pages (including this one), which contain 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!
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Question 1. (20 points) Your company is creating identification numbers for the various products it manufactures. The identification numbers will be 6 digits long, and the last digit (the sixth digit) will be a check digit. To find the check digit, first compute a weighted sum from the first 5 digits (called d_1 through d_5) as follows:

$$\text{weighted sum} = 3d_1 + 5d_2 + 3d_3 + 5d_4 + 3d_5.$$

The check digit is the remainder when this weighted sum is divided by 8.

(a) (8 points) What are the possible check digits under this check digit scheme?

(b) (12 points) The first 5 digits of an identification number are 96407. What is the check digit for this identification number?

Question 2. (20 points) Planet Express, a shipping company, uses identification numbers to track the packages it ships. Each identification number is 8 digits long. The last digit (the eighth digit) is a check digit, which is chosen so that the following weighted sum, computed from all 8 digits (called d_1 through d_8), is a multiple of 10:











$$\text{weighted sum} = 1d_1 + 3d_2 + 5d_3 + 7d_4 + 2d_5 + 4d_6 + 6d_7 + 8d_8.$$

During transit, the identification number on a particular package was damaged, and one of the digits is now unreadable, as shown below.

920__ 3815

What is the missing digit?

Question 3. (20 points) The 5-bit Postnet code is described in the table below.

Digit	Code	Digit	Code
1		6	
2		7	
3		8	
4		9	
5		0	

(a) (5 points) Draw the Postnet code that represents the number 73108. (You need not include guard bars.)

(b) (5 points) Identify the number represented by the following Postnet code. (It does not include guard bars.)



(c) (10 points) The following Postnet code (which does not include guard bars) contains one error. Identify *where* the error is, and explain how you know. You do not need to correct the error.



Name: _____

Math 203: Contemporary Mathematics

Chapter 1 test, version (b)

Thursday, January 22, 2009

60 points

Instructions:

1. This test has 4 pages (including this one), which contain 3 questions. Please check that you have all of the pages.
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 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.
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 6. Erase or cross out work you do not wish to be graded.
 7. You have 25 minutes to complete this test. Good luck!
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Question 1. (20 points) Planet Express, a shipping company, uses identification numbers to track the packages it ships. Each identification number is 8 digits long. The last digit (the eighth digit) is a check digit, which is chosen so that the following weighted sum, computed from all 8 digits (called d_1 through d_8), is a multiple of 10:

$$\text{weighted sum} = 8d_1 + 6d_2 + 4d_3 + 2d_4 + 7d_5 + 5d_6 + 3d_7 + 1d_8.$$

During transit, the identification number on a particular package was damaged, and one of the digits is now unreadable, as shown below.

4197 20_3

What is the missing digit?

Question 2. (20 points) Your company is creating identification numbers for the various products it manufactures. The identification numbers will be 6 digits long, and the last digit (the sixth digit) will be a check digit. To find the check digit, first compute a weighted sum from the first 5 digits (called d_1 through d_5) as follows:











$$\text{weighted sum} = 5d_1 + 7d_2 + 5d_3 + 7d_4 + 5d_5.$$

The check digit is the remainder when this weighted sum is divided by 8.

(a) (8 points) What are the possible check digits under this check digit scheme?

(b) (12 points) The first 5 digits of an identification number are 45320. What is the check digit for this identification number?

Question 3. (20 points) The 5-bit Postnet code is described in the table below.

Digit	Code	Digit	Code
1		6	
2		7	
3		8	
4		9	
5		0	

(a) (5 points) Draw the Postnet code that represents the number 24361. (You need not include guard bars.)

(b) (5 points) Identify the number represented by the following Postnet code. (It does not include guard bars.)



(c) (10 points) The following Postnet code (which does not include guard bars) contains one error. Identify *where* the error is, and explain how you know. You do not need to correct the error.

