

Math 200 - 2nd Final Exam
May 16, 2011

Name _____
Score _____

Show all work to receive full credit. Supply explanations where necessary. Multiple choice problems are worth 0, 1, or 2 points depending on your answer and the work shown.

1. A student said that all odd numbers are prime. Which one of the following is a counterexample?
 - (a) 2
 - (b) 7
 - (c) 9
 - (d) 12

2. Compute the sum: $1 + 2 + 3 + 4 + \cdots + 1723 + 1724 + 1725$
 - (a) 1,488,675
 - (b) 2,977,350
 - (c) 5,182
 - (d) 1,487,812.5

3. Which one of the following sets is NOT well defined?
 - (a) The set of all natural numbers
 - (b) The set of all integers less than -12
 - (c) The set of all whole numbers less than 0
 - (d) The set of all big integers

4. The first term of a **geometric series** is 4 and its ratio is 7. Which one of the following is its third term?
 - (a) 1372
 - (b) 196
 - (c) 18
 - (d) 25

5. If $A = \{2, 4, 6\}$ and $B = \{1, 3\}$, then which one of the following is $n(A \times B)$?
 - (a) 6
 - (b) (1, 6)
 - (c) $\{1, 2, 3, 4, 6\}$
 - (d) 5

6. Choose the multiplication model that best fits the following problem situation: *A restaurant offers combo meals with choices of 10 different entrees and 6 different appetizers. How many different combo meals are offered?*
- (a) array
 - (b) missing factor
 - (c) repeated addition
 - (d) Cartesian product
7. Which one of the following is a fraction that is equivalent to $36/6$ but has a numerator of 18?
- (a) 6
 - (b) $108/18$
 - (c) $18/3$
 - (d) $18/12$
8. Which one of these is NOT a correctly written base-seven numeral?
- (a) 66006_{seven}
 - (b) 1110011_{seven}
 - (c) 5_{seven}
 - (d) 17_{seven}
9. Let Z be the set of integers. Which one of the following is NOT an element of the set $A = \{x \mid x = 3n + 1 \text{ where } n \in Z\}$.
- (a) 10
 - (b) -6
 - (c) -2
 - (d) 7
10. Compute the sum: $321_{\text{five}} + 113_{\text{five}} + 24_{\text{five}}$
- (a) 1013_{five}
 - (b) 458_{five}
 - (c) 513_{five}
 - (d) 423_{five}

11. Choose the division model that best fits the following problem situation: *Ms. Smith has 24 markers that she must divide into 6 groups of equal size. How many markers will there be in each group?*
- (a) missing factor
 - (b) repeated subtraction
 - (c) Cartesian product
 - (d) set partition
12. If x is a negative number, then what can be said about $-2x$?
- (a) $-2x$ is negative
 - (b) $-2x$ is positive
 - (c) $-2x$ could be zero
 - (d) More information is needed
13. Suppose $A = \{x, y, z\}$ and $A \sim B$. Which one of the following must be true?
- (a) $x \in B$
 - (b) $n(B) = 3$
 - (c) $B = \overline{A}$
 - (d) $A \cup B = A$
14. Which one of the following facts demonstrates the associative property of multiplication?
- (a) $2(x + 1) + 4 \cdot 5 = 2(x + 1) + 5 \cdot 4$
 - (b) $(6x + 10) = 2(3x + 5)$
 - (c) $2 \cdot (6 \cdot 7) + 1 = (2 \cdot 6) \cdot 7 + 1$
 - (d) $(4 + 1) + 2 = 4 + (1 + 2)$
15. Which one of the following divisibility tests is incorrect?
- (a) A whole number is divisible by 3 if the sum of its digits is divisible by 3.
 - (b) A whole number is divisible by 6 if is divisible by both 2 and 3.
 - (c) A whole number is divisible by 8 if the number formed by its last three digits is divisible by 8.
 - (d) A whole number is divisible by 9 if the number formed by its last 2 digits is divisible by 9.

16. (5 points) Clearly state the steps of the problem-solving process (in order). Then choose any one step and state two different strategies associated with that step.

17. (5 points) Use a model to illustrate and compute each product. (Model what is given, not a related problem.)

(a) $2 \times \frac{3}{7}$

(b) $\frac{1}{3} \times \frac{2}{5}$

(c) -4×3

18. (5 points) 184 children were asked to name the fruits they often eat. The following results were obtained:

- 91 said bananas
- 97 said apples
- 69 said grapes
- 42 said bananas and apples
- 21 said bananas and grapes
- 35 said apples and grapes
- 12 said bananas, apples, and grapes

Organize this data in a three-set Venn diagram. How many children surveyed named none of these three fruits?

19. (5 points) Use any method to find both the GCD and LCM of 630 and 6615.

20. (5 points) Carefully explain how you would efficiently determine whether 839 is prime? Is it?

21. (5 points) Write the numeral 353_{six} in expanded form. Then list the next five base-six numerals.

22. (5 points) Clearly state the rule for adding two integers with opposite signs. Give an example that illustrates your rule.

23. (5 points) Suppose U is the set of all Americans, A is the set of all American smokers, and B is the set of all Americans with health problems. **Describe a person** who is an element of each of the following sets.

(a) $A \cap B$

(b) $A \cap \overline{B}$

(c) $B - A$

24. (5 points) Write a whole number with five different digits. Then use divisibility tests to test for divisibility by 2, 3, 4, 5, 6, 8, 9, 10, and 11.