

Math 190
Spring 2012
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Test 1

Show all your work

Name: _____
Score: ____/35

Problem 1: A 281 cm long ribbon is cut in two pieces such that one is 89 cm longer than the other. How long is the shorter piece?

If x is the length of the short piece, then the other piece has length $x + 89$. Thus $(x) + (x + 89) = 281$, so $2x + 89 = 281$, so $2x = 281 - 89 = 192$, so $x = \frac{192}{2} = 96$. Thus the short piece is 92 cm long.

Score: ____/3

Problem 2: John has four times as many songs in his MP3 player as his mother. Together, they have 5285 songs. How many songs does each have?

Say John's mother has x songs. Then John has $4x$ songs, and together they have $x + 4x = 5x$ songs. Thus $5x = 5285$, so $x = \frac{5285}{5} = 1057$, and $4x = 4228$. Thus John has 4228 songs, and his mother has 1057.

Score: ____/3

Problem 3: Consider a universe $U = \{x \mid x \text{ is a positive odd integer less than } 20\}$, $A = \{3, 7, 15, 17, 19\}$, $B = \{1, 3, 5, 17, 19\}$, and $C = \{1, 5, 19\}$.

- a. True or False: The cardinality of A is the same as the cardinality of B .
- b. $A \cap C =$
- c. List the members of the following set: $\bar{A} \cap C =$
- d. List the members of the following set: $A \cup \bar{B} =$

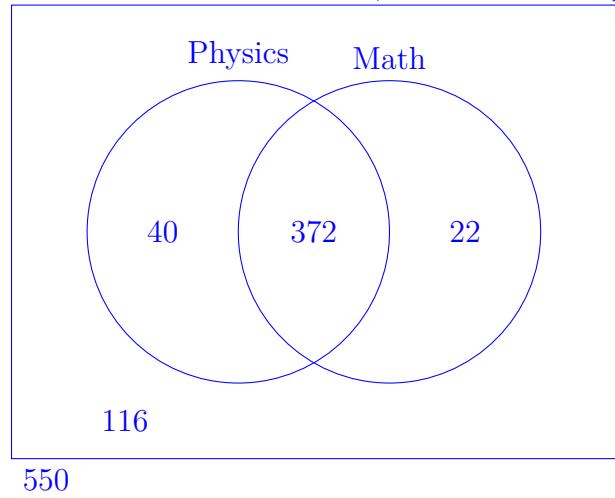
- a. Both A and B have cardinality 5.
- b. $A \cup C = \{19\}$.
- c. Since $\bar{A} = \{1, 5, 9, 11, 13\}$, it follows that $\bar{A} \cup C = \{1, 5\}$.
- d. Since $\bar{B} = \{7, 9, 11, 13, 15\}$, it follows that $A \cup \bar{B} = \{3, 7, 9, 11, 13, 15, 17, 19\}$.

Score: ____/4

Problem 4: The records of 550 high school graduates were examined, and the following information was obtained: 394 took mathematics, and 412 took physics. If 22 of those who took mathematics did not take physics, how many graduates took both classes?

Draw and label a Venn diagram illustrating the above situation.

Of the 394 who took math, 22 did not take physics, so $394 - 22 = 372$ took both classes.



Score: /5

Problem 5: Convert 10011_2 to a number in base 10.

$$10011_2 = 1 \cdot 2^4 + 0 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0 = 16 + 0 + 0 + 2 + 1 = 19.$$

Score: /2

Problem 6: Among the numerals you studied, name two which have place values and name their bases.

Mayan in base 20 and Babylonian in base 60.

(If you forgot that, Problem 8 should have reminded you...)

Score: /3

Problem 7:

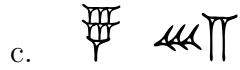
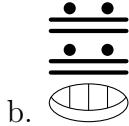
- How many tens are in 357?
- How many whole tens are in 357?
- How many pennies are in \$357?
- How many dimes are in \$357?
- For the number 8357.146, write the name of each place value under each digit. Please write the number out again in a much larger font with more space in between.

	8	thousands
a. 35.7	3	hundreds
	5	tens
b. 35	7	ones
c. 35 700	.	
	1	tenths
d. 3 570	4	hunderdths
	6	thousandths

Score: /5

Problem 8: Convert the following numbers to Hindu Arabic numerals.

- MCMXCIV



- 1994 (Roman)
- 5040 (Mayan)
- 452 (Babylonian)

Score: /6

Problem 9: Perform the following operation in the bases indicated.

- Express your answer in base 7, and check the addition in base 10 for

$$45_7 + 22_7$$

- Perform the subtraction in base 4 for

$$213_4 - 32_4$$

- $100_7 = 49_{10}$.
- 121_4

Score: /4