

Final Exam

Remember: Leave me some bread crumbs!  
You can do this! Remember: keep a positive attitude!

1. Use Gauss' method to find the following sums. **4 points**

a)  $1 + 2 + 3 + 4 + \cdots + 897 + 898 + 899 + 900$

b)  $1 + 3 + 5 + 7 + \cdots + 393 + 395 + 397 + 399$

c)  $5 + 10 + 15 + 20 + \cdots + 990 + 995 + 1005$

2.. Use one of DeMorgan's Laws to write an equivalent statement: **4 points**

Joan is not busy and she is not trying to do too much.

3. Negate the following statement. Do not use "it is not true that ...." or "not all..."  
**4 points**

Nobody doesn't like Sara Lee.

4. Convert  $13,976_{\text{ten}}$  to base 8. **5 points**

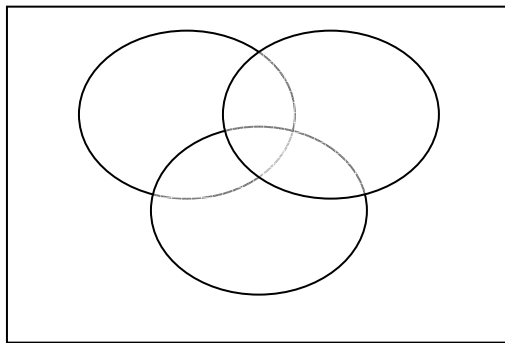
5. Write 23,630 as a Mayan numeral. **5 points**

6. Use the Egyptian method to multiply: 
$$\begin{array}{r} 367 \\ \times 289 \\ \hline \end{array}$$
 **4 points**

7. MusiChan.com surveyed a group of subscribers regarding which online music channels they use on a regular basis. The following information summarizes their answers:

- 7 listened to Rap, Heavy Metal, and Alternative Rock
- 10 listened to Rap and Heavy Metal
- 13 listened to Heavy Metal and Alternative Rock
- 12 listened to Rap and Alternative Rock
- 17 listened to Rap
- 24 listened to Heavy Metal
- 22 listened to Alternative Rock
- 9 listened to none of these three channels

- a) Construct a Venn diagram to model the above problem. **4 points**  
**2 points each**
- b) How many people were surveyed?
- c) Find the probability that a randomly selected person listened to Heavy Metal only.
- d) Find the probability that a randomly selected person listened to Heavy Metal given that the person listened to Rap.
- e) How many people listened to either Rap or Alternative Rock?
- f) How many people listened to Rap and Alternative Rock?
- g) Find the probability that a randomly selected person listened to at most one of these channels.
- h) Find the probability that a randomly selected person listened to Rap and Alternative Rock but not Heavy Metal.
- i) How many people listened to Rap and Heavy Metal but not Alternative Rock?
- j) Are the events “listening to Heavy Metal” and “listening to Rap” mutually exclusive events? Why or why not?



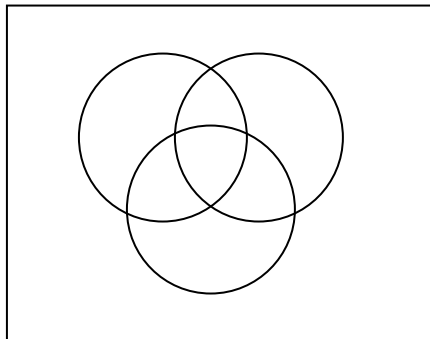
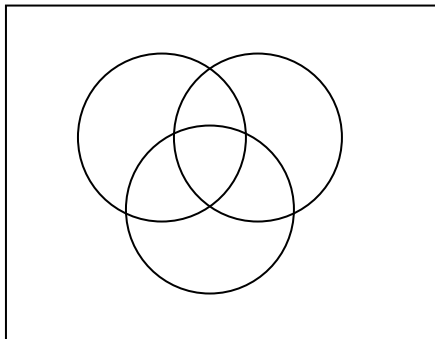
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_
- e) \_\_\_\_\_
- f) \_\_\_\_\_
- g) \_\_\_\_\_
- h) \_\_\_\_\_
- i) \_\_\_\_\_
- j) \_\_\_\_\_

8. Find the units digit (the ones digit) of  $3^{7317}$ . **5 points**

9. Shade the appropriate region in the Venn Diagram.

a)  $A' \cap (B \cup C)'$

b)  $A \cup (B' \cap C)$



10. Given the set  $\{1, 2, 3, 4, 5, 6, 7\}$ . Two different (without replacement) numbers are chosen from the set. Find each of the following. **2 points each**

- a) How many different sets of two distinct numbers can be chosen?
  
  
  
  
  
  
  
  
  
  
- b) How many ways can two distinct odd numbers be chosen?
  
  
  
  
  
  
  
  
  
  
- c) Find the probability that two distinct odd numbers are chosen?
  
  
  
  
  
  
  
  
  
  
- d) Find the probability that the sum of the two numbers chosen is odd.
  
  
  
  
  
  
  
  
  
  
- e) Find the probability that both numbers chosen are perfect squares.

11. A club consists of ten women and 15 men. **2 points**

- a) How many ways can a President, a Vice President, and a Secretary be chosen?
  
  
  
  
  
  
  
  
  
  
- b) How many ways can the President be a woman?
  
  
  
  
  
  
  
  
  
  
- c) Find the probability that the President and Vice President are women and the Treasurer is a man.
  
  
  
  
  
  
  
  
  
  
- d) How many different committees of four can be chosen?
  
  
  
  
  
  
  
  
  
  
- e) How many different committees of four can be chosen if two members are women and two members are men?

f) Find the probability that in a committee of four, two members are women and two members are men.

g) How many committees of four contain at least 3 women?

h) Find the probability that a committee of four contains at least 3 women.

12. Construct a truth table for the statement:  $\sim p \rightarrow \sim (\sim q \vee r)$ . **6 points**

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13. Convert  $3413_{\text{five}}$  to base 10. **5 points**

14. The Morgan Hill Car Rental Agency charges a one-time fixed charge of \$35 for a Ford Taurus and a mileage charge of \$0.20 per mile. **10 points**

- i. Write a linear equation to determine the cost of driving  $m$  miles.
- ii. Graph the equation.
- iii. Use the equation to find the cost of driving from San Francisco to Los Angeles and back (806 miles).
- iv. How far can you drive for \$200?

**15.** Oak Hill Cemetery in San Marcos, California will not bury anyone living outside of California? Why? **3 points**

**16.** A man decides to visit a series of casinos. It costs \$1.00 to enter the first one. He plays various games of chance and ends up losing half of his money. Upon leaving, he pays a \$1.00 tip to the croupier. Visiting another casino, he again pays a \$1.00 entrance charge and again loses half of his money. Still generous, he again tips the croupier \$1.00. And so he makes his way to the third establishment with a similar \$1.00 price of admission. Again, his unlucky streak continues and he loses half of his money. "Oh well," he says to third sympathetic croupier, "it's just not my lucky day. You might as well have a tip too, though it's my last dollar." The question is how much money did he start the day with? **5 points**

17. Use the Russian peasant method to multiply:  $\begin{array}{r} 197 \\ \times 216 \\ \hline \end{array}$  **4 points**

18. Use inductive reasoning to determine the next term in the sequence. **3 points each**

a) 1, 2, 4, 8, 16, 32, \_\_\_\_\_

b) 1, 5, 25, 125, \_\_\_\_\_

c) 1, 8, 27, 64, 125, \_\_\_\_\_

19. Convert  $101110011_2$  to decimals. **4 points**

20. Determine whether the argument is valid or invalid. **10 points**

If Eddie goes to town, then Mabel stays at home.

If Mabel does not stay at home, then Rita will cook.

Rita will not cook.

Therefore, Eddie does not go to town.

Let  $p$  = Eddie goes to town

$q$  = Mabel stays at home

$r$  = Rita will cook

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**Good luck and have a great summer. Keep in touch and let me know how you are doing. It's been a great semester.**

**Joan**