

**Math 1313**  
**Test 3 Supplemental Review**

**For questions 1 – 12, state the type of problem and calculate the answer.**

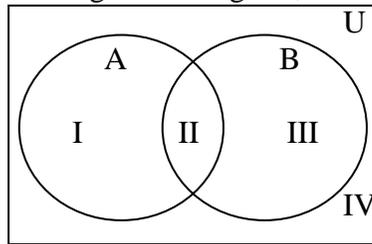
1. Parents of a college student wish to set up an account that will pay \$350 per month to the student for four years. How much should they deposit now at 9% annual interest, compounded monthly?
2. A tractor costs \$16,000. You pay 25% down and finance the rest with equal monthly payments of 6 years. If you must pay 18% annual interest compounded monthly, what is your monthly payment? How much interest will you pay over the 6 years?
3. What is the effective rate of interest for money invested at 10% annual interest compounded monthly?
4. A newborn child received a gift of \$5000 towards a college education from her grandparents. How much will the gift be worth in 17 years if it is invested at 9% annual interest compounded quarterly?
5. Your friend's payments on his new car are \$524.37 per month. He received a \$3000 trade-in on his old car, and received a financing package that was 8.9% annual interest, compounded monthly for five years. What was the total purchase price of the car?
6. A company estimates that it will have to replace a piece of equipment at a cost of \$10,000 in 5 years. The owner wants to have this money available when the equipment is replaced. He can make fixed quarterly payments and earn interest at 6% annual interest compounded quarterly. How much should the payments be?
7. Cassie's graduation is coming up. She has decided to take a trip to Cancun after graduation. She anticipates she'll need \$2,000 for the hotel, air, and spending money. How much should she deposit in an account that pays 10.56% per year compounded monthly to have the funds available when she graduates in 2 years?
8. Jenna wants to begin saving money for a new car. She can make monthly payments of \$150 into an account at her credit union which pays 5% annual interest compounded monthly. How much money will she have available for her new car in three years?
9. Jack and Jill bought a house costing \$150,000. They made a 20% down payment on the house and financed the rest with a conventional mortgage for 30 years at 6.25% annual interest, compounded monthly. How much are their monthly payments?
10. Betty and Bob would like to buy a house, but don't have a down payment. They anticipate that they will need \$20,000 cash to buy a house. Their bank is paying 4.8% annual interest compounded quarterly. What should their quarterly payments be if they wish to have the down payment in five years?

11. A health club offers to let you join for \$50 down and payments of only \$36 per month for 3 years. When you read the fine print, you discover that the interest rate is 18% per year compounded monthly. What is the cash price of the health club membership? How much will the club membership cost you after 3 years?
12. Starting on his 25<sup>th</sup> birthday, Fred deposits \$750 per quarter into a retirement account that pays 6% annual interest compounded quarterly. He makes his last payment on his 45<sup>th</sup> birthday. How much is in the account at that time? How much will be in the account if he leaves it alone until his 65<sup>th</sup> birthday?
13.  $U = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19\}$   
 $A = \{1, 5, 9, 13, 17\}$   
 $B = \{3, 7, 9, 13, 17\}$   
 $C = \{1, 9, 17, 19\}$   
 $D = \{5, 7, 11, 13\}$

Find

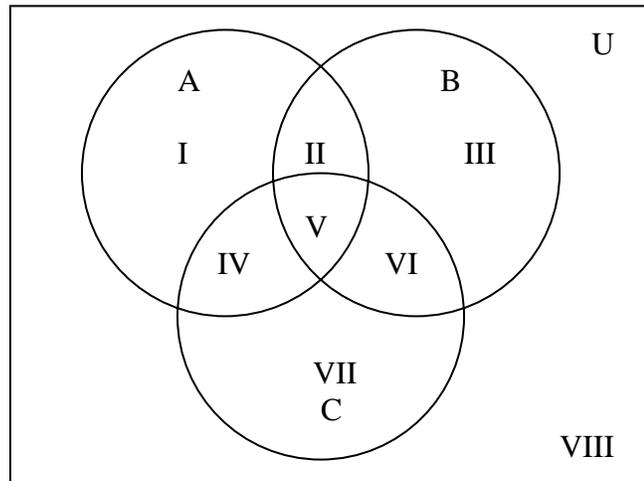
- $A \cup B^c$
- $C \cap D$
- $A \cup (B \cap C^c)$
- $((D \cup B)^c \cap C)$
- $A^c \cup C^c$

14. A: Given the following Venn diagram, which region(s) make(s) up:



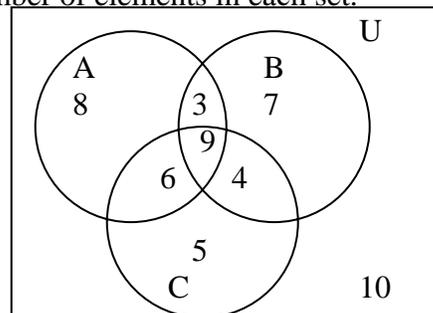
- $A^c \cap B$
- $B^c \cup A$
- $A^c \cap B^c$
- $(A \cap B)^c$

B: Given the following Venn diagram, which region(s) make(s) up:



- a.  $(C \cup B)^c \cap A$
- b.  $(A \cup C)^c \cup B^c$
- c.  $B^c \cap (A \cap C)$
- d.  $A \cup (B \cap C)^c$
- e.  $((C \cup B)^c \cup A)^c$
- f.  $(C^c \cap A^c) \cup B$      Hint: Using DeMorgan's Law makes it easier.
- g.  $A^c \cup (B^c \cup C^c)$      Hint: Using DeMorgan's Law makes it easier.
- h.  $A \cap B$
- i.  $A \cup C$
- j.  $(C \cup B)^c$
- k.  $(C \cap A)^c$
- l.  $(A^c \cup B)^c$

15. Find the number of elements in each set.



- a.  $n(A)$
- b.  $n(A \cap B^c \cap C^c)$
- c.  $n(A^c \cap B \cap C)$
- d.  $n(A \cup B \cup C)^c$

- e.  $n(B \cap (C^c \cup A^c))$
- f.  $n(B \cup C) \cap A^c$
- g.  $n(A \cup (B \cap C)^c)$
- h.  $n(C \cap (B \cap A^c))$
- i.  $n(A^c \cup (C^c \cap B))^c$

16. If  $U$  is a universal set with  $n(U) = 200$ ,  $A$  and  $B$  are subsets of  $U$  with  $n(A) = 73$ ,  $n(B) = 84$  and  $n(A \cap B) = 16$ , find

- a.  $n(A^c \cup B)$
- b.  $n(A^c \cup B^c)$

17. Of 300 investors surveyed, 129 use a discount broker, 148 use a full-service broker and 41 use both. How many investors

- a. use at least one kind of broker?
- b. use exactly one kind of broker?
- c. use only a discount broker?
- d. invest without using a full-service broker or a discount broker?
- e. use at most one kind of broker?

18. 800 college freshmen were surveyed regarding their enrollment in Math, Physics and English classes. The survey revealed the following:

184 were enrolled in Physics and Math  
 399 were enrolled in Math  
 168 were enrolled in Physics and English  
 314 were enrolled in Physics  
 101 were enrolled in all three  
 212 were enrolled in Math and English  
 418 were enrolled in English

- a. How many were enrolled in Math only, English only or Physics only?
- b. How many were enrolled in exactly two of the three courses?
- c. How many were enrolled in at least two courses?
- d. How many were enrolled in none of the three courses?
- e. How many were enrolled in at most one of the three courses?
- f. How many were enrolled in at most two of the three courses?
- g. How many were enrolled in Math or Physics?
- h. How many were enrolled in English and Physics?
- i. How many were enrolled in Math and English but not Physics?
- j. How many were enrolled in English or Physics but not Math?
- k. How many were not enrolled in Math or English but were enrolled in Physics?

19. The Health Care Plan gives 6 basic health plans, 4 dental plans and 3 vision plans. How many possible health care plans are there if we choose 1 from each category?
- 20. A travel agency offers several options for its New Orleans getaway package. A customer can choose from 3 different flight schedules, 5 different hotels, 11 different restaurants and 6 different jazz clubs. How many package deals are there if a package consists of 1 flight schedule, 1 hotel, 3 restaurants and 4 jazz clubs?**
21. A serial number on an appliance is as follows: a letter (not I or O) followed by 4 nonzero digits followed by 2 letters (not O) followed by 5 digits. How many possible serial numbers are there? Repeated numbers or letters is allowed.
22. License plates in a certain town are made up of 5 digits. The digits can be letters or numbers and 0 is the same as the letter O. How many possible license plates are possible? Repetition is not allowed.
23. How many permutations can be formed from the letters of the word:
- bookkeeper
  - nonillion
  - committee
24. In how many ways can 15 different cookbooks be arranged on a shelf?
25. In how many ways you choose 4 books from 13 different books to be arranged on a shelf?
26. You are going on a long road trip. Since you are not driving you decide to take some books to read on the road. In how many ways can you choose 8 books from 17 different books to take on the trip? Assume all 17 books are books you'd love to read on the road.
27. You are going on a long road trip. Since you are not driving you decide to take some books to read on the road. You decide to take 10 books on the trip. In how many ways can you choose to read the books?
28. There are 25 teachers in the math department of a high school. The department has to appoint a committee to formulate a homework policy. In how many ways can the 5 member committee be selected?
29. A company gives Best Buy gift certificates to five of its employees each year at an annual banquet. The company has 40 employees. In how many ways can the gift certificates be awarded if an employee can only receive one award?

30. A company gives gift certificates to five of its employees each year at an annual banquet. One gift certificate is for \$100 from Best Buy, one is for \$75 from Borders, one is for \$50 from Pappas Restaurants, one is for \$150 from Bering's, and one is of \$125 from Nordstrom's. The company has 40 employees. In how many ways can the gift certificates be awarded if an employee can only receive one award?

31. The drama club, which is made up of 11 boys and 27 girls, is selecting cast member for an upcoming play. There are 6 male cast members and 7 female cast members. Any club member is eligible for any part of his/her own gender, and each club member can only have one part. In how many ways can the cast be chosen?

32. Suppose 4 pens are selected at random from a box containing 9 yellow pens and 6 blue pens. In how many ways can you choose:

- a. 2 will be yellow and 2 will be blue?
- b. 3 blue pens?
- c. at least 1 yellow pen?

33. Given a standard deck of cards, two cards are dealt from a well-shuffled deck. What is the probability that:

- a. both are aces?
- b. one is a heart and the other is a spade?

34. A club has 58 members, 38 men and 20 women. A committee must consist of 8 people. In how many ways can the committee consist:

- a. at least 3 women?
- b. at least 7 men?
- c. at most 1 woman?
- d. at most 7 men?

35. Forty Americans were asked, "Which of the following media sources do you use most to get news about your local community?" The following data resulted:

Source	Number of Responses
Newspaper	12
Television	20
Radio	5
Other	3

Determine the probability distribution associated with these data.

36. Students at a certain high school were asked to state how many hours per week they spent doing homework. Results of the survey revealed the following information?

Time Spent ( in hours – x)	Percentage of Students
$0 \leq x \leq 1$	19.4
$1 < x \leq 3$	23.3
$3 < x \leq 6$	35.7
$x > 6$	21.6

- Find the probability distribution associated with these data.
- What is the probability that a student selected at random spent no more than 3 hours a week doing homework?
- What is the probability that a student selected at random spent more than 1 hour a week doing homework?
- What is the probability that a student selected at random spent at most 6 hours a week doing homework?

37. A pair of fair dice is rolled. Find the probability that

- a pair of 2's is thrown.
- exactly one 2 is thrown.
- the sum of the two numbers facing up is more than ten.
- a double is not thrown.

38. Let S be a sample space and E and F events of S.

- $P(E^c) = 0.7$ ,  $P(F^c) = 0.6$  and  $P(E \cup F) = 0.5$ . Find  $P(E \cap F)$ .
- $P(E^c) = 0.82$ ,  $P(F^c) = 0.65$  and  $P(E \cup F)^c = 0.55$ . Find  $P(E \cap F)$ .

39. Suppose  $P(E) = .55$ ,  $P(F) = .65$ ,  $P(E \cap F^c) = .20$ . Find

- $P(E \cap F)$
- $P(E \cup F)$
- $P(E \cup F^c)$

40. Suppose  $P(E) = .79$ ,  $P(F^c) = .24$ ,  $P(E \cap F^c) = .18$ . Find

- $P(E \cup F)$
- $P(E \cup F^c)$
- $P(E \cap F)$
- $P(E^c \cap F)$
- $P(E \cup F)^c$

41. Suppose  $P(E^c) = .61$ ,  $P(F^c) = .44$ ,  $P(E \cup F)^c = .3$ . Find
- $P(E^c \cup F^c)$
  - $P(E \cup F)$
  - $P(E^c \cap F)$
  - $P(E \cap F^c)$
  - $P(E \cup F^c)$
  - $P(E^c \cup F)^c$
42. Suppose  $P(E \cap F) = .18$ ,  $P(E \cup F)^c = .22$ ,  $P(F^c) = .63$ . Find
- $P(E^c \cap F)$
  - $P(E \cup F^c)$
  - $P(E^c)$
  - $P(E \cup F)$
43. A total of 36 members of a club play tennis, 28 play squash and 18 play badminton. Furthermore, 22 members of the club play both tennis and squash, 12 play both tennis and badminton and 9 play both squash and badminton. A total of 4 members play all three sports. Every member of the club plays at least one of the three sports. What is the probability that a randomly selected member of the club plays:
- exactly one sport?
  - at least two sports?
44. If a coin is tossed 14 times.
- What is the probability that tails comes up at least once?
  - What is the probability that heads will come up exactly 10 times?
  - What is the probability that heads comes up at least 10 times?
  - What is the probability that heads comes up at most 12 times?
45. A box contains 20 computer chips, 5 of which are defective. Seven chips are taken out at random for testing. What is the probability that
- exactly one chip is defective?
  - 2 chips are defective and 5 are not defective?
  - at least 4 are defective?
  - at most 4 are defective?
46. There are 8 orange and 6 blue marbles in an urn. Suppose you choose 5 marbles at random. What is the probability that
- 3 marbles are orange?
  - at least 2 marbles are blue?
  - at most 4 marbles are orange?