

TEST POLICIES (REMINDERS)

If you know that you will be absent on the day of a test, it may be possible to make arrangements with me to take the test on an earlier day. This alternative is not automatic!! Each case will be considered individually. You should notify me as soon as possible regarding planned absences. There are no make-up exams provided for unexpected absences. If you miss an exam for an unexpected absence, the average that you earn on the final will make-up the score for your missed exam. There are no exceptions – do not ask!!

HONOR POLICY: You must observe the following rules during any in class exam or quiz.

- (1) Be prepared to move to a designated seat if requested. I will request that the class sit every other row if possible.
- (2) You are not to leave the room without permission.
- (3) You must not look anywhere in the room other than at your own test paper.
- (4) You may not use or even touch a cell phone. Remember your cell phone is to be silenced in class.
- (5) You may not speak to another student.
- (6) You may not share materials with another student.
- (7) Have all your materials ready. You may not retrieve items from your backpack etc.

Failure to observe all of the policies will result in a zero score for the test or quiz.

When you complete the test, hand it to me personally. You may leave the room at this time. The only questions permitted during an exam are in reference to a misprint, omission, or illegible text. You are responsible for being prepared for the exam. Do not ask me how to do the problem, ask for a hint about how to do the problem, or ask whether or not your answer is correct. Please do not share (at this time) your misery of being absent for a particular topic, that you forgot how to do the problem, or that you do not have enough time. You will not have the time to figure out problems on exam day. You are to come prepared, polished, and ready to complete the exam. You must turn in your test paper when time is called. I will give a five minute warning before collecting exams. If you do not hand in your paper at that time, I will not accept it later. It is your responsibility to keep track of time during the exam.

TEST REVIEW PROBLEMS

This test review will give you an idea of the difficulty level of the problems that will be on the exam. This test review contains a sample problem from every topic that will be covered on the exam. Test problems will be similar, but not identical. If you have done all the homework, asked for help as needed, and reviewed the material diligently, you should now find this review easy to moderate to complete. If you struggle with the review, we will go over some solutions in class. However, please be aware that your struggle is an indication that you should go back to the homework sets and work additional problems similar to those on this review in order to perform well on the exam.

The problems begin on the next page. The answers are included at the end of the review.

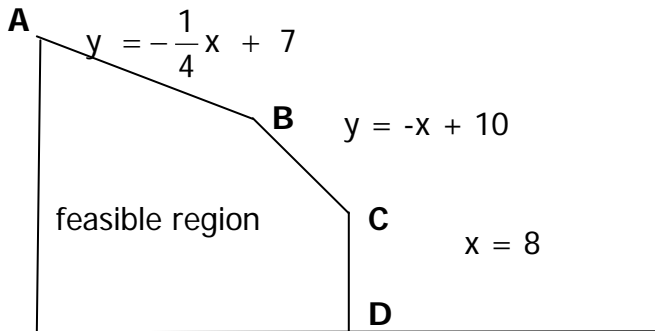
**** Also review group work exercises, quizzes, and class examples. ****

1. Graph the feasible set for the following system of inequalities. Clearly label the lines with their equations, darken the boundary lines and note the feasible region. State whether the feasible region is bounded or unbounded and give the coordinates of the corner points.

A. $4x + y \geq 8$
 $x + y \geq 5$
 $x + 3y \geq 9$
 $x, y \geq 0$

B. $x + 3y \leq 18$
 $2x + y \leq 16$
 $x \geq 0$
 $y \geq 0$

2. Find the coordinates of the corner points, A,B,C, & D, of the feasible region graphed below:



3. A. Which of the corner points (from #2) **MAXIMIZES** the objective function $P = 2x + 3y$?
 B. State the value of x and y. C. State the maximum value of P.
4. A company makes two kinds of engineering pencils, Type I and Type II (deluxe). Type I needs 2 min of sanding and 4 min of polishing. Type II needs 2 min of sanding and 8 min of polishing. The sander can run no more than 86 hours per week and the polisher can run no more than 89 hours a week. A \$6 profit is made on Type I and \$10 profit on Type II. How many of each type should be made per week to maximize profit?

DO NOT SOLVE THE PROBLEM!! Just answer the following questions A – D.

- A. Define the variables for this problem.
 B. Make a table summarizing all of the data.

- C. Write an expression in X and Y for the objective function.
 D. Write the system of **all inequalities** that must be satisfied to solve this problem.

5. A nutritionist, working for NASA, must meet certain nutritional requirements and yet keep the weight of the food at a minimum. He is considering a combination of two foods, which are packaged in tubes. Each tube of food A contains 4 units of protein, 2 units of carbohydrates, 2 units of fat, and weighs 3 pounds. Each tube of food B contains 3 units of protein, 6 units of carbohydrates, and 1 unit of fat, and weighs 2 pounds. The dietary requirement calls for 42 units of protein, 30 units of carbohydrates, and 18 units of fat. How many tubes of each food should be supplied to the astronauts?

DO NOT SOLVE THE PROBLEM !!! Just answer the following questions A – D.

- A. Define the variables for this problem.
- B. Make a table summarizing all of the data.

- C. Write an expression in X and Y for the objective function.
- D. Write the system of **all inequalities** that must be satisfied to solve this problem.

6. True or False:

- A. $2 \in \{1, 2, 3, 4\}$
- B. $\{0, 1, 2, 3\} \subset \{1, 2, 3, 4\}$
- C. $\{5, 10, 15\} = \{15, 10, 5\}$
- D. $\{1, 2\} \in \{\{1, 2\}, \{1, 3\}, \{2, 3\}\}$

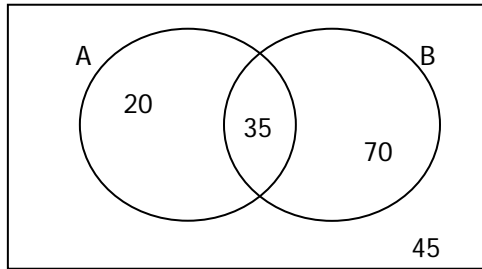
7. Write the result:

- A. $\{1, 2, 3, 4\} \cup \{2, 3, 4, 5\}$
- B. $\{1, 2, 3, 4\} \cap \{2, 3, 4, 5\}$
- C. $\{1, 2, 3, 4\} \cap \{5, 6\}$

8. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$; $A = \{2, 4, 6, 8\}$; $B = \{1, 2, 3, 5, 7\}$ Find

- A. A'
- B. $A \cap B$
- C. $A \cup B$
- D. $A \cap B'$
- E. $A \cup B'$
- F. $(A \cup B)'$

9. Use the Venn Diagram to find the number of elements in each of the following sets:



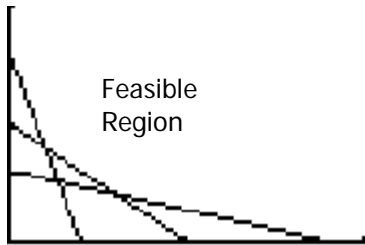
- | | | | | | | | |
|----|---|----|------|----|---------------|----|---------------|
| A. | A | B. | B | C. | $A \cap B$ | D. | $A \cup B$ |
| E. | U | F. | A' | G. | $(A \cap B)'$ | H. | $(A \cup B)'$ |

10. Blood samples of 100 people were tested. The A, B and Rh were found in the blood of 32, 33, and 74 people respectively. None of the antigens were found in 13 samples. Ten samples contained the A and Rh antigens only, 9 contained the B and Rh antigens only, 6 contained the B antigen only and 3 contained the A and B antigens only.
- Draw a Venn diagram displaying the above information.
 - How many samples contained the A and B antigen?
 - How many samples do not contain the Rh antigen?
11. In the 6th grade of a school there were 39 students. A survey was taken to see what they liked on their hot dogs. The results are: 22 liked mustard, 17 liked ketchup, 13 liked pickle relish, and 4 liked both ketchup and pickle relish, 7 liked mustard and pickle relish but not ketchup, 4 liked mustard and ketchup but not pickle relish and 8 liked only mustard.
- How many don't like any of these items on their hot dogs?
 - How many like ketchup and pickle relish but not mustard?
 - How many like exactly 1 of these items on their hot dogs?
 - How many like exactly two of these items on their hot dogs?
12. A store has 75 pairs of women's shoes. 24 are red, 24 have buckles, and 27 have low heels. 15 red pairs have no buckles, 10 red pairs have low heels, and 11 pairs have low heels and buckles. Finally 4 are red with low heels and buckles.
- How many red pairs have buckles?
 - How many with low heels are not red?
 - How many red pairs have neither low heels nor buckles?
 - How many have neither low heels nor buckles?
13. A baseball card collector has 200 different baseball cards. She has 95 outfielders, 50 New York Yankees, and 45 members of the Hall of Fame. Moreover, she has 15 Yankees who are members of the Hall of Fame, 35 Yankee outfielders, 25 outfielders who are members of the Hall of Fame, and 5 Yankee outfielders who are members of the Hall of Fame.
- How many cards does she have which are neither Yankees, outfielders, nor members of the Hall of Fame?

- B. How many Hall of Fame members does she have who are neither Yankees nor outfielders?
- C. How many outfielders does she have who are either members of the Hall of Fame or Yankees but not both?
14. A Coin is tossed 5 times and the sequence of heads and tails is observed. How many different possible outcomes are there?
15. Eight horses are entered in a race. In how many ways can they cross the finish line if ties are not allowed?
16. How many four-digit sequences can be formed? (There are 10 ten digits available: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9) How many sequences are there if there can be no repeats? How many sequences begin and end with the same digit, repeats of other digits also allowed?
17. How many different lines can 6 people form?
18. An exam consists of 5 multiple-choice questions; each question has 4 choices. Assuming all questions are answered, how many ways can the test be completed?
19. Suppose an alphabet contains 30 distinct letters. How many 3-letter words can be formed allowing repetition of letters?
20. If a club has 25 members how many ways can 2 people be selected to go to a special convention?
21. If a club has 25 members how many ways can 3 people be selected to hold the offices of president, secretary, and treasurer?
22. At an office party the president draws names for three different prizes. How many ways could the prizes be awarded if the company has 25 employees?
23. A password is to be designed to contain three letters, two digits, and one of five symbols.
- A. How many passwords are possible if neither the letters nor digits can be repeated?
- B. How many passwords are possible if the letters can't be repeated, but repetition of digits is allowed?
- C. How many passwords are possible if both the letters and digits can be repeated?
24. Mabel has ten distinct flower pots.
- A. How many ways can she arrange four pots in a row on her deck?
- B. How many ways can she chose two flower pots to donate to charity?

ANSWERS:

1A.



The corner points are (0, 8), (1, 4), (3, 2) and (9, 0).

1B.



The corner points are (0, 6), (6, 4), and (8, 0).

2. A (0, 7) B (4, 6) C (8, 2) D (8, 0)

3. A. B B. $x = 4, y = 6$ C. $P = 26$

4. A. Let $x = \#$ of Type I pencils; $y = \#$ of Type II pencils

B.

	TYPE I	TYPE II	AVAILABLE HOURS
SANDING	2	2	86
POLISHING	4	8	89
PROFIT	6	10	

C. Maximize Profit = $6x + 10y$ subject to the given constraints.

D. $2x + 2y \leq 86$
 $4x + 8y \leq 89$
 $x, y \geq 0$

5. A. Let $x = \#$ of ounces of Food A; $y = \#$ of ounces of Food B.

B.

	FOOD A	FOOD B	REQUIREMENTS
PROTEIN	4	3	42
CARBOHYDRATE	2	6	30
FAT	2	1	18
WEIGHT	3	2	

C. Minimize weight, $W = 3x + 2y$ subject to the given constraints.

D. $4x + 3y \geq 42$
 $2x + 6y \geq 30$
 $2x + y \geq 18$
 $x, y \geq 0$

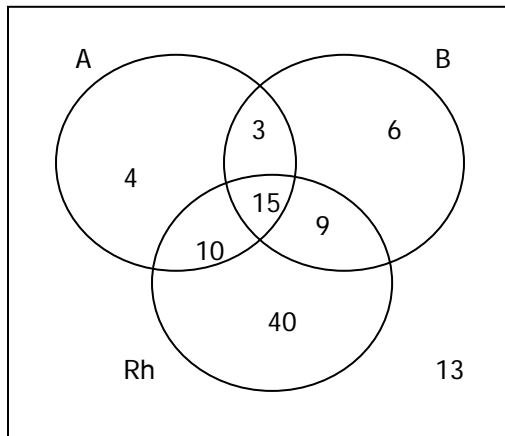
6. A. TRUE B. FALSE C. TRUE D. TRUE

7. A. {1, 2, 3, 4, 5} B. {2, 3, 4} C. \emptyset (THE EMPTY SET)

8. A. {1, 3, 5, 7} B. {2} C. {1, 2, 3, 4, 5, 6, 7, 8}
 D. {4, 6, 8} E. {2, 4, 6, 8} F. \emptyset

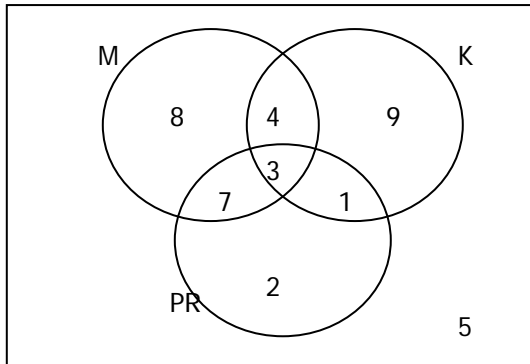
9. A. $20 + 35 = 55$ B. $35 + 70 = 105$ C. 35
 D. $20 + 35 + 70 = 125$ E. $20 + 35 + 70 + 45 = 170$
 F. $70 + 45 = 115$ G. $20 + 70 + 45 = 135$ H. 45

10.



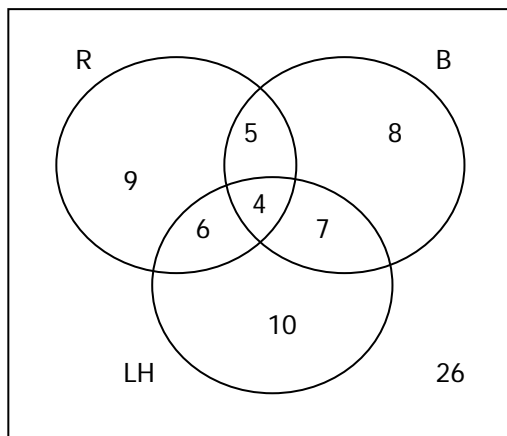
B. 18
 C. $13 + 4 + 3 + 6 = 26$

11.



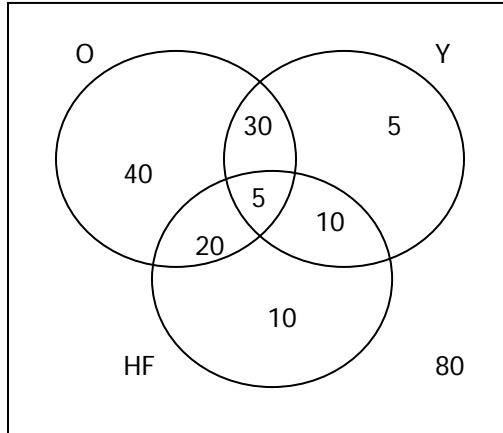
A. 5
 B. 1
 C. $8 + 9 + 2 = 19$
 D. $4 + 7 + 1 = 12$

12.



A. 9
 B. $10 + 7 = 17$
 C. $5 + 4 = 9$
 D. $9 + 26 = 35$

13.



- A. 80
 B. 10
 C. $20 + 30 = 50$

14. $2^5 = 32$

15. $8!$

16. $10^4; 10 \cdot 9 \cdot 8 \cdot 7; 10^3$

17. $6!$

18. 4^5

19. 30^3

20. $C_{25,2} = 300$

21. $P_{25,3} = 13,800$

22. $P_{25,3} = 13,800$

23. A. $26 \cdot 25 \cdot 24 \cdot 10 \cdot 9 \cdot 5 = 7,020,000$

B. $26 \cdot 25 \cdot 24 \cdot 10 \cdot 10 \cdot 5 = 7,800,000$

C. $26 \cdot 26 \cdot 26 \cdot 10 \cdot 10 \cdot 5 = 8,788,000$

24. A. $P_{10,4} = 5,040$

B. $C_{10,2} = 45$