

Math 1324 – Finite Mathematics
Reviewer for the Finals

1. Gina invests \$20,000 in two portfolios: some at 6% and some at 4%. Altogether, she makes \$1040 per year interest. How much is invested at 4%?
2. A scanner is on sale at 15% off. The sale price is \$425. What was the original price?
3. VACUUMANIA, Inc. produces two models of handheld mini-vacuums, model TX281 and model HB667. Model TX281 requires 2 hours of assembly time and model HB667 requires 3 hours of assembly time. The parts for model TX281 costs \$25 per vacuum and the parts for model HB667 costs \$30 per vacuum. If the company has a total of 34 hours of assembly time and \$365 available per day for these two models, how many of each can be made in a day?
4. Use the Gauss-Jordan Method to solve the following problem: Dried fruit costs \$4 per pound, pretzels \$3 per pound, and nuts \$8 per pound. How many pounds of each should be used to produce 140 pounds of trail mix costing \$6 per pound, in which there are twice as many pretzels (by weight) as dried fruit?
5. Set up a system of inequalities for the following problem and graph the region of feasible solution: ABC BakeShoppe makes both cakes and cookies. Each batch of cakes requires 2 hours in the oven and 3 hours in the decorating room. Each batch of the cookies needs 1.5 hours in the oven and $\frac{2}{3}$ of an hour in the decorating room. The oven is available no more than 15 hours a day, while the decorating room can be used no more than 13 hours a day.
6. How many batches of cakes and cookies should ABC BakeShoppe in Exercise 5 make in order to maximize profits if cookies produce a profit of \$20 per batch and cookies produce a profit of \$30 per batch?
7. Use simplex method to do the following minimization problem: Glenn Russell, who is dieting, requires two food supplements, I and II. He can get these supplements from 2 different products, A and B. From A, he gets 4 grams of supplement I per serving, and 2 grams of II. From B, he gets 2 grams and 5 grams of supplements I and II respectively. His physician has recommended that he include at least 20 grams of supplement I and 18 grams of II in his diet. If product A costs 24c per serving, and product B costs 40c per serving, how can he satisfy these requirements most economically?
8. Use Venn diagram to solve the following problem: A survey of a group of military personnel revealed the following information:
 - 20 officers
 - 27 minorities
 - 19 women
 - 5 women officers
 - 8 minority women
 - 10 minority officers
 - 3 women minority officers
 - 6 Caucasian male enlisted personnel
 - (a) How many were interviewed?
 - (b) How many were enlisted minority women?
 - (c) How many were male minority officers?
9. A card is drawn from a well-shuffled deck of 52 cards. Find the probability of drawing:
 - (a) A 7
 - (b) A red card
 - (c) A red 7
 - (d) A spade
 - (e) The 7 of clubs
 - (f) A 3 or a Jack

- (g) A red Jack or a black 5
 (h) A black face card
10. The following data were gathered for 130 adult U.S. workers:
 55 women
 3 women earned more than \$40,000
 62 men earned less than \$40,000
 Find the probability that an individual is:
 (a) a woman earning less than \$40,000
 (b) a man earning more than \$40,000
 (c) a man or is earning more than \$40,000
 (d) a woman or is earning less than \$40,000
11. A shop that produces custom kitchen cabinets has 2 employees: Sitlington and Capek. 95% of Capek's work is satisfactory and 10% of Sitlington's work is unsatisfactory. 60% of the shop's cabinets are made by Capek, and the rest by Sitlington. Find the probability that:
 (a) an unsatisfactory cabinet is made by Capek
 (b) a finished cabinet is unsatisfactory
12. The probability that a person with certain symptoms has hepatitis is 80%. The blood test used to confirm this diagnosis gives positive results for 90% of those who have the disease and 5% of those without the disease. What is the probability that an individual with the symptoms reacts positively to the test has hepatitis?
13. In an experiment on plant hardiness, a researcher gathers 6 wheat plants, 3 barley plants, and 2 rye plants. She wishes to select 4 plants at random.
 (a) In how many ways can this be done?
 (b) In how many ways can this be done if 2 wheat plants must be included?
14. A baseball team has 15 players. How many 9-player batting orders are possible?
15. A cellular phone manufacturer randomly selects 5 of every 50 phones from the assembly line and tests them. If 80% pass inspection, the batch of 50 is considered acceptable. Find the probability that a batch is acceptable if it consists of the following:
 (a) 2 defective phones
 (b) No defective phones
 (c) 3 defective phones
16. A flu vaccine has a probability of 80% of preventing a person who is inoculated from getting flu. A county health office inoculates 134 people. What is the probability that exactly 10 of them get the flu?
17. Suppose that an assembly line has the following transition matrix
- $$\begin{matrix} & W & w' \\ \begin{matrix} W \\ w' \end{matrix} & \begin{bmatrix} .95 & .05 \\ .85 & .15 \end{bmatrix} \end{matrix}$$
- where W is the state when the assembly line is functioning well and w' is the state when it is out-of-order. Find the long-run probability that the line will work properly.
18. Let X represent a random variable and prepare the probability distribution for the following experiment: Three cards are drawn from a deck and the number of kings is counted.
19. A magazine distributor offers a first prize of \$100,000, two second prizes of \$40,000 each, and two third prizes of \$10,000. A total of 2,000,000 entries are received in the contest. Find the expected winnings if you submit 1 entry to the contest. If it would cost you 35c in time, paper, and stamps to enter, would it be worth it?
20. Find the mean, median, and mode for the following list of numbers: 6, 3, 4, 4, 2, 7, 6, 8, 9
21. Find the range and standard deviation for the following list of numbers: 6, 3, 4, 4, 2, 7, 6, 8, 9

22. Find the percent of the total area under the standard normal curve between $z = -3.11$ and $z = 1.44$.
23. Find a z -score such that 20% of the area under the standard normal curve is to the left of z .
24. The scores on a standardized test in Kelly High School have a mean of 80 and a standard deviation of 12. What is the probability that a student will have a score less than 60?
25. Twenty percent of third-world women would like to avoid pregnancy but are not using birth control. For 50 such women, use the normal curve approximation to find the probability that exactly 10 are not using birth control.

Answers

1. She invested \$8000 at 4%.
2. The original price is \$500.
3. 5 of TX281 and 8 of HB667 can be made in a day.
4. Use 40 lb of pretzels, 20 lb of dried fruit, and 80 lb of nuts.
5. See diagram below
6. BakeShoppe should make 3 batches of cakes and 6 batches of cookies for a maximum profit of \$210.
7. Glenn should use 4 servings of A and 2 of B for a minimum cost of \$1.76.
8. (a) 52 (b) 5 (c) 7
9. (a) $1/13$ (b) $1/2$ (c) $1/26$ (d) $1/4$ (e) $1/52$ (f) $2/13$ (g) $1/13$
(h) $3/26$
10. (a) .4 (b) .1 (c) .6 (d) .9
11. (a) .43 (b) .07
12. .986
13. (a) 330 (b) 150
14. 1,816,214,400
15. (a) .992 (b) 1 (c) .977
16. .000036
17. .944
18. Let X = number of kings in each draw. So X can take values 0, 1, 2, and 3. $P(X = 0) = .783$, $P(X = 1) = .204$, $P(X = 2) = .013$, $P(X = 3) = .0002$
19. $E(x) = 10c$, therefore, not worth it.
20. Mean = 5.4, Median = 6, Mode(s) = 4 and 6
21. Range = 7, Standard Deviation = 2.22
22. 92.42%
23. $z = -.84$
24. .3798
25. .1428