

M118 Finite Mathematics
FINAL REVIEW

Name _____

- 1) Find the amount due on a loan of \$8,500 at 7.5% simple interest at the end of 4 years.

- 2) If an investor buys a 39 week T-bill with a maturity value of \$25,000 for \$23,543, what annual simple interest rate will the investor earn? (Express your answer as a percentage, correct to one decimal place.)

- 3) If you buy a 26 week T-bill with a maturity value of \$10,000 for \$9,693.78, what annual simple rate of interest will you earn? (Express answer as a percentage, correct to three decimal places.)

- 4) Housing costs have been increasing at 8% per year compounded annually for the past 8 years. A house with a \$160,000 value now would have had what value 8 years ago?
N = _____
I% = _____
PV = _____
PMT = _____
FV = _____
P/Y = _____
C/Y = _____

- 5) What is the present value of an ordinary annuity that pays \$400 per quarter for 6 years if money is worth 9% compounded quarterly?
N = _____
I% = _____
PV = _____
PMT = _____
FV = _____
P/Y = _____
C/Y = _____

6) A family has a \$130,000, 20 year mortgage at 10.8% compounded monthly.

- a) Find the monthly payment. _____
- b) Find the unpaid balance after 10 years. _____

(4 points)

a)

N = _____
I% = _____
PV = _____
PMT = _____
FV = _____
P/Y = _____
C/Y = _____

b)

7) A woman needs to repay her loan for her new furniture that cost \$1500.. Construct a table that will repay the loan in 6 monthly payments at 1.25% per month on the unpaid balance.

8) How much should you deposit in an account paying 10% compounded quarterly in order to receive \$500 per quarter for the next five years?

N = _____
I% = _____
PV = _____
PMT = _____
FV = _____
P/Y = _____
C/Y = _____

9) A couple wishes to borrow \$85,000 in order to buy a house. They can pay a maximum of \$750 per month. If the loan is at 9.5% compounded monthly,

- a) how many months will it take to pay off the loan? (Round answer to next higher month if not an integer.)

b) How much total interest is paid by the couple? _____

a)

N = _____
I% = _____
PV = _____
PMT = _____
FV = _____
P/Y = _____
C/Y = _____

b)

- 10) An individual makes annual year-end deposits of \$500 into an ordinary annuity. After 10 years, the annuity is worth \$9,700. What annual rate (compounded annually) has this annuity earned?

N = _____
I% = _____
PV = _____
PMT = _____
FV = _____
P/Y = _____
C/Y = _____

- 11) A person deposits \$2,000 each year for 25 years into an IRA. When she retires immediately after making the 25th deposit, the IRA is worth \$220,000.

a) Find the interest rate earned over the 25-year period leading to retirement.

b) Assume the IRA continues to earn the interest rate found in part (a). How long can the retiree withdraw \$30,000 per year? _____

c) How long can she withdraw \$24,000 per year? _____

N = _____
I% = _____
PV = _____
PMT = _____
FV = _____
P/Y = _____
C/Y = _____

- 12) Solve by substitution: $2x - 3y = 7$
 $4x + y = 7$

- 13) Solve by elimination using addition: $8x - 4y = 10$
 $12x - 6y = -15$

- 14) Solve by using a matrix:

$$\begin{array}{r} x_1 - 3x_2 - 3x_3 = 13 \\ x_2 - 4x_3 = 5 \\ x_1 + x_3 = -4 \end{array}$$

15) Solve by any method :

$$\begin{aligned}4x - 2y + 6z &= 1 \\3x + 4y + 2z &= 1 \\2x - y + 3z &= 2\end{aligned}$$

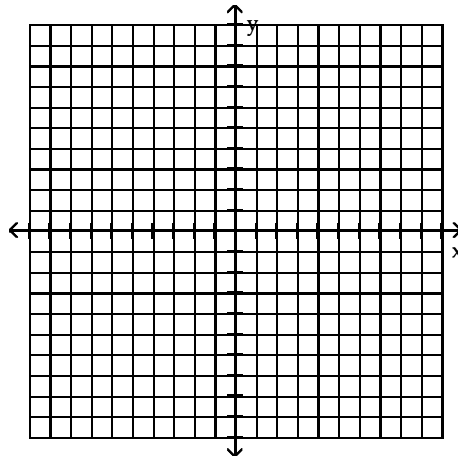
16) Solve by any method: show the initial matrix and final solution

$$\begin{aligned}3x + 6y - 9z &= 15 \\2x + 4y - 6z &= 10 \\-2x - 3y + 4z &= -6\end{aligned}$$

17) A hospital dietitian wants to insure that a certain meal consisting of rice, broccoli, and fish contains exactly 26,800 units of vitamin A, 840 units of vitamin E, and 11,160 units of vitamin C. One ounce of rice contains 400 units of vitamin A, 20 units of vitamin E, and 180 units of vitamin C. One ounce of broccoli contains 800 units of vitamin A, 60 units of vitamin E, and 540 units of vitamin C. One ounce of fish contains 2,400 units of vitamin A, 40 units of vitamin E, and 810 units of vitamin C. How many ounces of each food should this meal include? Set up a system of linear equations, and solve.

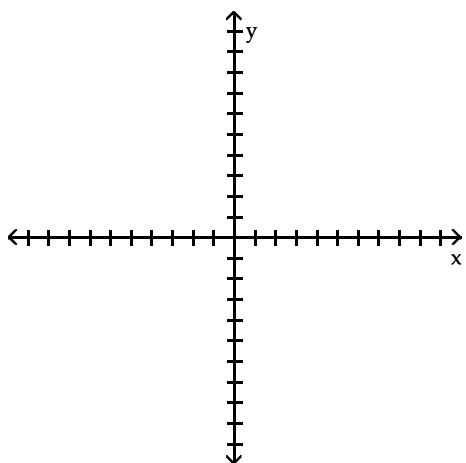
18) A trucking firm wants to purchase 10 trucks that will provide exactly 28 tons of additional shipping capacity. A model A truck holds 2 tons, a model B truck holds 3 tons, and a model C truck holds 5 tons. How many trucks of each model should the company purchase to provide the additional shipping capacity? Set up a system of linear equations, and solve.

19) A steel company produces two types of machine parts, part A and part B. Part A requires 8 hours of casting time and 2 hours of firing time. Part B requires 4 hours of casting time and 6 hours of firing time. The maximum number of hours per week available for casting and firing are 70 and 65 respectively. The company makes an \$8 profit on each part A and a \$5 profit on each part B that it produces. How many of each type should the company produce each week in order to maximize its profit? (Show the equations and label all corner points) (5 points)



20) Solve graphically:
(5 points)

$$\begin{aligned}x + 2y &= 5 \\ 3x - 3y &= -21\end{aligned}$$



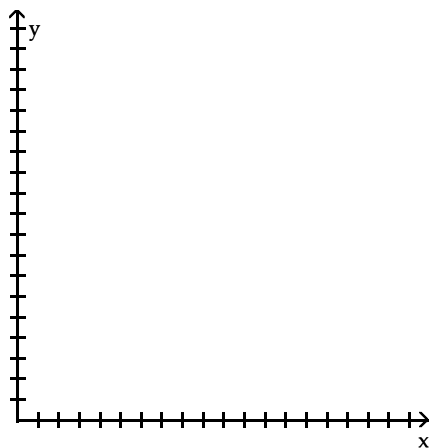
21)

Minimize and maximize $C = x + 6y$ **LABEL ALL CORNER POINTS**

Subject to $3x + 4y \geq 36$

$$2x + y \leq 14$$

$$x, y \geq 0$$



22) In how many ways can a student work 7 out of 10 questions on an exam?

- 23) A test is composed of 4 multiple choice problems and 8 questions that can be answered true or false. Each multiple choice problem has 4 choices. How many different response sheets are possible if only one choice is marked for each question?
- 24) A basketball player with a free throw shooting percentage of 80% gets fouled and goes to the line to shoot two free throws.
- a) What are the odds in favor of her making her first shot? _____
 - b) What are her odds for making both shots? _____
- 25) A basketball team has 5 different positions. Out of 8 players, how many 5-man teams are possible if:
- a) distinct positions are taken into consideration? _____
 - b) distinct positions are not taken into consideration? _____
 - c) distinct position is not taken into consideration but either Mike or Joe (but not both) must be on the team? _____
- 26) Suppose you pay \$1.00 to roll a fair die with the understanding that you will get back \$3.00 for rolling 2 or 5. What are your expected winnings?

- 27) A bin contains 72 light bulbs of which 10 are defective and 62 are perfect. A sample of 8 bulbs is drawn at random from the bin. Find
- a) the probability that exactly one defective bulb is drawn. _____
 - b) the probability that at least 1 defective bulb is drawn? _____
- (4 points)
- 28) A group of 25 people contains 10 brunettes, 8 blondes, and 7 redheads. Of the 20 girls in the group, 8 are brunettes, 6 are blondes, and 6 are redheads. A person is selected at random. Are the events of being a girl and having brown hair independent? **Show mathematically why or why not.**
- 29) A lawyer estimates that 70% of her clients are guilty. She feels that her guilty clients are acquitted 60% of the time and that her innocent clients are acquitted 95% of the time. Suppose one particular client has been acquitted. Find the probability that the client is innocent.
- 30) Find the mean, median, mode and standard deviation for the data set:
2, 11, 35, 2, 9, 35, 11, 9, 7, 2, 2, 2, 2, 9, 2.
- Mean _____ Median _____ Mode _____ Std Deviation _____

- 31) The duration of routine operations in a certain hospital has approximately a normal distribution with an average of 130 minutes and a standard deviation of 15 minutes. What percentage of operations
- a) last longer than 150 minutes? _____
 - b) between 112 and 142 minutes? _____
- 32) Each year a company selects 5 employees for a training program at a nearby university. On the average, 40% of those sent complete the course in the top 10% of their class. If we consider an employee finishing in the top 10% of the class a success in a binomial experiment, then for the 5 employees entering the program there exists a binomial distribution ($P(x$ successes out of 5)).
- a) Write the function defining the distribution _____
 - b) Construct a table for the distribution.
 - c) Compute the mean _____
 - d) Compute the standard deviation _____
- 33) A company guarantees customer satisfaction on the purchase of a product, or the company will refund the purchase price of the product. Previous experience has shown that 10% of the purchases are returned. What is the probability that
- a) no more than 1 of the next 7 purchases will be returned? _____
 - b) exactly 2 purchases will be returned? _____

34) Find the mean and median for the following grouped data.

Interval	Frequency
9.5-12.5	2
12.5-15.5	3
15.5-18.5	8
18.5-21.5	4

mean _____ median _____

35) . The weekly record of reported accidents in a large auto assembly plant in a random sample of 35 weeks from the past 10 years is listed below:

34 33 36 35 37 31 37
39 34 35 37 35 32 35
33 35 32 34 32 32 39
34 31 35 33 31 38 34
36 34 37 34 36 39 34

- Construct a frequency and relative frequency table using class intervals of width 2 and starting at 29.5.
- Construct a histogram.
- Construct a frequency polygon.
- Construct a cumulative frequency polygon.
- Find the mean of the grouped data _____
- Find the standard deviation of the grouped data _____
- Find the median of the data _____
- What is the probability that a week chosen at random will have reported accidents between 33.5 to 37.5? _____

