

Learning and practice has occurred using the student resources and graded assignments in this course. When studying math you should not study in order, practice using the eText and MLM HW assignments. If you can work the questions without your notes correctly then you are ready for an exam, otherwise seek help and ask questions. MLM exams have 12 to 20 questions.

*\*NOTE: This study sheet may reflect some exam questions, however, this study sheet may not reflect every type of question that may be included on the exam.*

**In a survey of the number of DVDs in a house, the table shows the probabilities.**

Number of DVDs	0	1	2	3	4 or more
Probability	0.05	0.024	0.33	0.21	0.17

- Find the probability of a house having 3 or more DVDs.

**For the polynomial function find the following: (i) Degree of the polynomial; (ii) All x intercepts; (iii) The y intercept.**

- $y = 35 - x^2 + 2x$

**Solve the problem.**

- If \$300,000 is to be saved over 25 years, how much should be deposited monthly if the investment earns 8% interest compounded monthly?
- How much should you invest now at 6% compounded semiannually to have \$8,500 to buy a car in 2.5 years?
- In order to purchase a home, a family borrows \$267,000 at 10.8% for 15 yr. What is their monthly payment? Round the answer to the nearest cent.
- The average cost per tape, in dollars, for a company to produce x sports videotapes is given by the function

$$A(x) = \frac{11x + 50}{x} \text{ for } x > 0$$

Graph the function on the interval  $(0, \infty)$  and complete the following:  $A(x) \rightarrow \underline{\hspace{1cm}}$  as  $x \rightarrow \infty$ .

- A bank makes a home mortgage loan of \$180,000 at 7.25% amortized in equal monthly payments over 30 years. What is the total amount paid in interest when the mortgage is paid off (round to the nearest dollar)?
- Cheraw Auto Repair believes that it will need new equipment in 10 years. The equipment will cost \$26,000. What lump sum should be invested today at 8% compounded semiannually, to yield \$26,000?
- If an investor buys a 39-week T-bill with a maturity value of \$25,000 for \$23,543 what annual interest rate (annual yield) will the investor earn? (Express your answer as a percentage, correct to one decimal place.)
- How many months will it take until an account will have \$3,500 if \$2,500 is invested now at 5% compounded monthly?
- You deposit \$130 each month into a savings account that pays 5.5% compounded monthly. How much interest will you have earned after 8 years?

**Find the equation of any horizontal asymptote.**

12.  $f(x) = \frac{7x^2 - 2x - 4}{4x^2 - 5x + 6}$

**Use a tree diagram to find the indicated probability.**

13. In the town of Cheraw, a certain type of laptop computer is sold at just two stores. Store A has 38% of the sales, 4% of which are of defective items, and store B has 62% of the sales, 2% of which are of defective items. A person receives one of these laptop computers as a gift. What is the probability it is defective?

**Graph the function.**

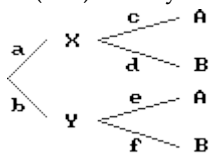
14.  $f(x) = 5^x$

15.

$$f(x) = \begin{cases} x - 1 & \text{if } x < 1 \\ -4 & \text{if } x \geq 1 \end{cases}$$

**Use the tree diagram to find the requested probability.**

16. Find  $P(X|A)$ . Give your answer as a decimal and round your answer to three decimal places if necessary.



$a = 0.9, b = 0.1, c = 0.8, d = 0.2, e = 0.6, f = 0.4$

**Find the equations of any vertical asymptotes.**

17.  $f(x) = \frac{x^2 + 3x}{x^2 - 6x - 27}$

**Solve the equation.**

18. Solve for  $x$ :  $2^{4x} = 8^x + 5$

19.  $\log_6 (4x - 5) = 1$

**Write in terms of simpler forms.**

20.  $\log_b M^9$

**Find the function value.**

21. Given that  $f(x) = 5x^2 - 2x$ , find  $f(t + 2)$ .

**List the outcomes of the sample space.**

22. A fair die and a fair coin are tossed in succession. Find the sample space composed of equally likely events.

**Solve the problem.**

23. U. S. Census Bureau data shows that the number of families in the United States (in millions) in year  $x$  is given by  $h(x) = 51.42 + 15.473 \cdot \log x$ , where  $x = 0$  is 1980. How many families were there in 2002?
24. The State Employees' Credit Union offers a 1-year certificate of deposit with an APY (or effective rate) of 5.5%. If interest is compounded quarterly, find the actual interest rate. Round to the nearest tenth of a percent.
25. At the Stop 'n Go tune-up and brake shop, the manager has found that an SUV will require a tune-up with a probability of 0.6, a brake job with a probability of 0.1 and both with a probability of 0.02. What is the probability that an SUV requires a tune-up but not a brake job?
26. From a survey involving 2,000 students at a large university, it was found that 1,300 students had classes on Monday, Wednesday, and Friday; 1,500 students had classes on Tuesday and Thursday; and 800 students had classes every day. If a student at this university is selected at random, what is the (empirical) probability that the student has classes only on Tuesday and Thursday?
27. You have decided to buy a new stereo system for \$2,500 and agreed to pay in 30 equal quarterly payments at 1.25% interest per quarter on the unpaid balance. How much are your payments?
28. The number of books in a community college library increases according to the function  $B = 7200e^{0.03t}$ , where  $t$  is measured in years. How many books will the library have after 8 year(s)?
29. The distribution of bachelor degrees conferred by a local college is listed below, by major.
- | <u>Major</u> | <u>Frequency</u> |
|--------------|------------------|
| English      | 2073             |
| Mathematics  | 2164             |
| Chemistry    | 318              |
| Physics      | 856              |
| Liberal Arts | 1358             |
| Business     | 1676             |
| Engineering  | <u>868</u>       |
|              | 9313             |
- What is the probability that a randomly selected degree is not in Mathematics?

**Use Bayes' rule to find the indicated probability.**

30. An water well is to be drilled in the desert where the soil is either rock, clay or sand. The probability of rock  $P(R) = 0.53$ . The clay probability is  $P(C) = 0.21$ . The sand probability is  $P(S) = 0.26$ . If it is rock, a geological test gives a positive result with 35% accuracy. If it is clay, this test gives a positive result with 48% accuracy. The test gives a 75% accuracy for sand. Given the test is positive, what is the probability that soil is clay,  $P(\text{clay} | \text{positive})$ ?
31. The incidence of a certain disease on the island of Tukow is 4%. A new test has been developed to diagnose the disease. Using this test, 91% of those who have the disease test positive while 4% of those who do not have the disease test positive (*false positive*). If a person tests positive, what is the probability that he or she actually has the disease?

**Solve the problem.**

32. The point at which a company's costs equals its revenue is the break-even.  $C$  represents cost, in dollars, of  $x$  units of a product.  $R$  represents the revenue, in dollars, for the sale of  $x$  units. Find the number of units that must be produced and sold in order to break even.  
 $C = 15x + 12,000$        $R = 18x - 6000$
33. The owner of a video store has determined that the profits  $P$  of the store are approximately given by  $P(x) = -x^2 + 130x + 70$ , where  $x$  is the number of videos rented daily. Find the maximum profit to the nearest dollar.
34. The U. S. Census Bureau compiles data on population. The population (in thousands) of a southern city can be approximated by  $P(x) = 0.08x^2 - 13.08x + 927$ , where  $x$  corresponds to the years after 1950. In what calendar year was the population about 804,200?
35. The profit that the vendor makes per day by selling  $x$  pretzels is given by the function  $P(x) = -0.002x^2 + 1.4x - 400$ . Find the number of pretzels that must be sold to maximize profit.
36. How can the graph of  $f(x) = -\sqrt{x+1}$  be obtained from the graph of  $y = \sqrt{x}$ ?
37. Jennifer invested \$7000 in her savings account for 4 years. When she withdrew it, she had \$8792.60. Interest was compounded continuously. What was the interest rate on the account? Round to the nearest tenth of a percent.

**The graduates at a southern university are shown in the table.**

	Art & Science	Education	Business	
	A	E	B	Total
Male, M	342	424	682	1448
Female, F	324	102	144	570
Total	666	526	826	2018

**A student is selected at random from the graduating class.**

38. Find the probability that the student is female, given that an education degree is not received,  $P(F|E')$ .

**Find the expected value.**

39. A fair coin is tossed three times, and a player wins \$3 if 3 tails occur, wins \$2 if 2 tails occur and loses \$3 if no tails occur. If one tail occurs, no one wins. What is the expected value of the games?
40. Mr. Cameron is sponsoring an summer concert. He estimates that he will make \$300,000 if it does not rain and make \$60,000 if it does rain. The weather bureau predicts the chance of rain is 0.34 for the day of the concert. An insurance company is willing to insure the concert for \$150,000 against rain for a premium of \$30,000. If he buys this policy, what are his expected earnings from the concert?
41. A shipment of 20 digital cameras contains two that are defective. A random sample of three is selected and tested. Let  $X$  be the random variable associated with the number of defective cameras in a sample. Find the probability distribution of  $X$  and the expected number of defective cameras in a sample.

**Find the probability.**

42. A packet of sour worms contains four strawberry, four lime, two black currant, two orange sour, and three green apples worms. What is the probability that Dylan will not choose a green apple sour worm,  $P(\text{not green apple})$ ?

43. The table below describes the smoking habits of a group of asthma sufferers.

	Nonsmoker	Occasional smoker	Regular smoker	Heavy smoker	Total
Men	363	33	89	46	531
Women	443	40	66	44	593
Total	806	73	155	90	1124

If one of the 1124 people is randomly selected, find the probability that the person is a man or a heavy smoker.

44. A calculator requires a keystroke assembly and a logic circuit. Assume that 98% of the keystroke assemblies and 93% of the logic circuits are satisfactory. Find the probability that a finished calculator will be satisfactory. Assume that defects in keystroke assemblies are independent of defects in logic circuits.

45. The table shows the political affiliation of voters in a small midwestern town and their positions on stronger drug control laws.

	<u>Stronger Drug Control</u>	
	Favor	Oppose
Republican	0.11	0.27
Democrat	0.25	0.16
Other	0.15	0.06

Find the probability that a Democrat opposes stronger drug control laws.

46. In a batch of 8,000 clock radios 6% are defective. A sample of 11 clock radios is randomly selected without replacement from the 8,000 and tested. The entire batch will be rejected if at least one of those tested is defective. What is the probability that the entire batch will be rejected?

47. A lottery game has balls numbered 1 through 21. A randomly selected ball has an even number or a 10.

48. College students were given three choices of pizza toppings and asked to choose one favorite. The following table shows the results.

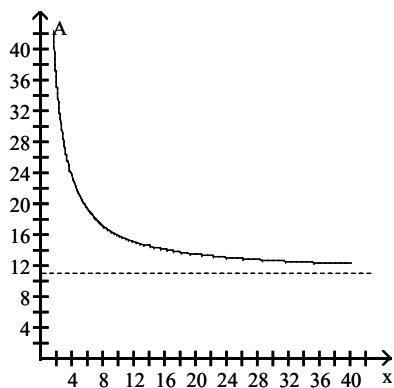
toppings	freshman	sophomore	junior	senior
cheese	11	11	23	19
meat	29	19	11	11
veggie	11	11	29	19

A randomly selected student prefers a cheese topping.

# Answer Key

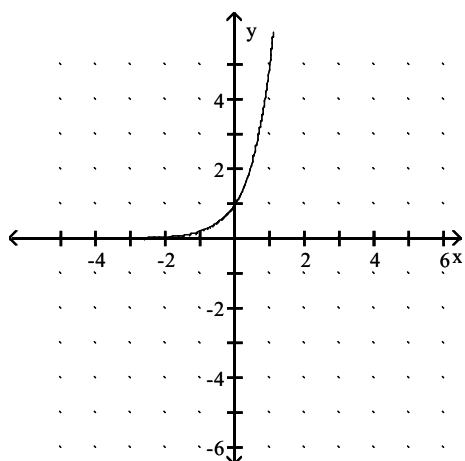
## Testname: MATH 1324 MLM FINAL EXAM STUDY SHEET

1. 0.38
2. (i) 2  
(ii) 7, -5  
(iii) 35
3. \$315.45
4. \$7,332.17
5. \$3001.27
- 6.



$A(x) \rightarrow 11$  as  $x \rightarrow \infty$ .

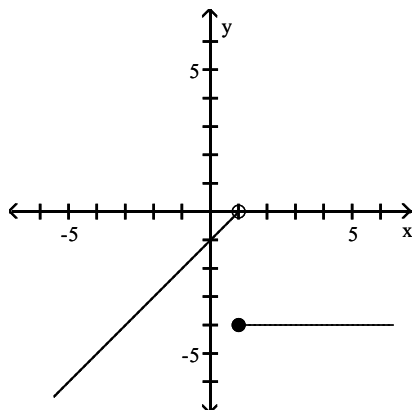
7. \$262,051.20
8. \$11,866.06
9. 8.3%
10. 81 months or 6 years, 9 months
11. \$3,152.54
12.  $y = \frac{7}{4}$
13. 0.028
- 14.



# Answer Key

Testname: MATH 1324 MLM FINAL EXAM STUDY SHEET

15.



16. 0.923

17.  $x = 9$

18. 15

19.  $\frac{11}{4}$

20.  $9 \log_b M$

21.  $5t^2 + 18t + 16$

22.  $\{(1, H), (1, T), (2, H), (2, T), (3, H), (3, T), (4, H), (4, T), (5, H), (5, T), (6, H), (6, T)\}$

23. 72 million

24. 5.4%

25. 0.58

26. 0.350

27. \$100.45

28. 9153

29. 0.768

30.  $P(\text{clay} \mid \text{positive}) = 0.209$

31. 0.487

32. 6000

33. \$4,295

34. 1960

35. 350 pretzels

36. Shift it horizontally 1 units to the left. Reflect it across the  $x$ -axis.

37. 5.7%

38.  $P(F \mid E') = \frac{117}{373}$

39. \$0.75

40. \$239,400

41.

$x_i$	0	1	2
$p_i$	0.7158	0.2684	0.0158

42.  $P(\text{not green apple}) = \frac{4}{5}$

43. 0.512

44. .9114

45. 0.390

## Answer Key

Testname: MATH 1324 MLM FINAL EXAM STUDY SHEET

46. 0.494

47.  $\frac{10}{21}$

48. .314