

FINAL EXAM REVIEW FOR MATH 1001

REVISED MAY 2019

1. Find the savings plan balance after 25 years with an APR of 3.5% and monthly payments of \$250. Round to the nearest dollar.
2. Draw a Venn diagram representing each of the categorical propositions below.
 - (a) No birds are four-legged creatures.
 - (b) Some mammals are four-legged creatures.
 - (c) All pigs are four-legged creatures.
 - (d) Some mammals are not four-legged creatures.
3. Rephrase the following statements in the form "if p , then q ."
 - (a) Attending practice is necessary for staying on the team.
 - (b) I am in California if I am in Los Angeles.
 - (c) Showing up at the party is sufficient to get a door prize.
 - (d) All monkeys are mammals.
4. Determine whether the following argument displays inductive or deductive reasoning.

Premise: $2 + 3 = 5$

Premise: $4 + 7 = 11$

Premise: $-8 + -1 = -9$

Premise: $0 + -5 = -5$

Conclusion: The sum of an even integer and an odd integer is always an odd integer.

- (a) inductive (b) deductive (c) neither of these (d) both inductive and deductive
5. For each number, identify the set that contains the given number but does not contain any of the other sets: Whole numbers, Integers, Rational numbers, Real numbers, or Imaginary numbers.

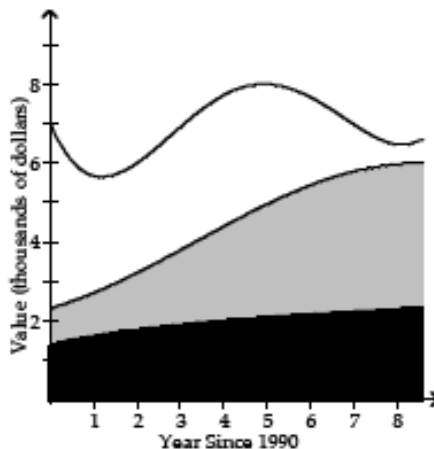
(a) 11 (b) -11 (c) $^2/_{11}$ (d) 11.3 (e) $\sqrt{11}$

6. Complete the probability distribution below and use it to answer the questions.

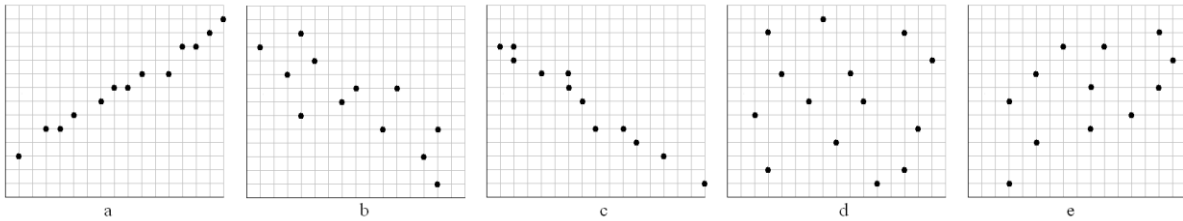
Number of Successes	4	3	2	1	0
Probability	0.0625	0.2500	?	0.2500	0.0625

- (a) What is the probability of exactly two successes?
- (b) What is the probability of getting 0, 1, or 2 successes?

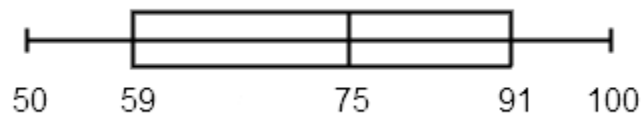
7. Suppose \$3,500 is deposited in the bank at an APR of 4.3% for 7 years.
- Find the accumulated balance if the interest is compounded annually.
 - Find the accumulated balance if the interest is compounded quarterly.
 - Find the accumulated balance if the interest is compounded monthly.
 - Find the accumulated balance if the interest is compounded daily.
 - Find the accumulated balance if the interest is compounded continuously.
8. Identify the type of study that would be most appropriate to answer the given question.
- How do lawyers' salaries compare to doctors' salaries?
 - Does running an hour each day lower blood pressure?
 - Does the new medication relieve depression?
 - Does caffeine cause birth defects?
9. Identify the type of sampling used in each scenario.
- 49 students are selected at random from the Sophomore class, 39 from the Junior class, and 48 from the Senior class.
 - A tax auditor selects every 1000th income tax return that is received.
 - A pollster uses a computer to generate 500 random numbers, then interviews the voters corresponding to those numbers.
 - To avoid working late, a quality control analyst simply inspects the first 100 items produced in a day.
10. The stack plot below shows the value of each of Danny's investments. The stack plot contains three regions. The uppermost unshaded region represents the value of Danny's investment in individual stocks. The center lightly-shaded region represents the value of Danny's investment in mutual funds. The bottom darkly-shaded region represents the value of Danny's investment in a CD. The thickness of a region at a particular time tells you its value at that time.
- In which year was the total value of Danny's investments the greatest?
 - In which year was the value of Danny's investment in individual stocks the highest?
 - In 1998, about what percentage of Danny's total investment was in mutual funds?
 - In 1998, about what percentage of Danny's total investment was in CDs?



11. Which type of correlation is illustrated in each of the following scatterplots?



12. The box plot for the test scores of 32 students is given below. Use it to answer the following questions.

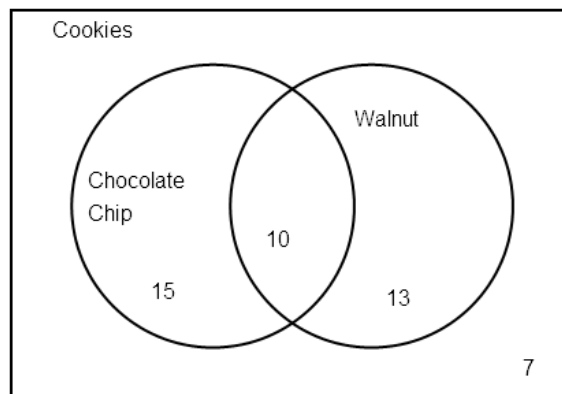


- (a) How many students made above 75?
- (b) How many students made below 91?
- (c) How many students made below 59?
- (d) How many students made between 59 and 91?
- (e) How many students made between 59 and 75?
13. What is the probability that a family that has four children does **not** have four children of the same gender? Assume that boys and girls are equally likely.
14. (a) Find the odds for getting three tails when three fair coins are tossed.
- (b) Find the odds for getting a sum of four when a pair of fair dice is tossed.
- (c) Find the probability of getting a four on either die or both die when a pair of fair dice is tossed.
- (d) Find the probability of drawing a black face card from a standard deck of cards.
15. For each of the situations described, determine whether the growth (or decay) is linear or exponential, and answer the question.
- (a) The population of Scoville is increasing at a rate of 310 people per year. If the population is 609 today, what will it be in three years?
- (b) The population of Oak Forest is increasing at a rate of 2% per year. If the population is 25,655 today, what will it be in three years?

15. (c) The value of your car is decreasing by 11% per year. If the car is worth \$8,176 today, what will it be worth in two years?
- (d) The price of a gallon of gasoline is decreasing by 8¢ per week. If the price is \$2.75 per gallon today, what will it be in ten weeks?
16. The doubling time of a city's population is 11 years. How long does it take for the population to quadruple?
17. The following table gives the birth and death rates for four towns in three different years. Find Littleton's net growth rate due to births and deaths in 1980, 1990, and 2000.

Town	Birth Rate (per 100)			Death Rate (per 100)		
	1980	1990	2000	1980	1990	2000
Simpleton	1.9	1.5	0.9	1.2	1.2	0.8
Normalton	2.8	2.4	2.1	0.7	0.6	0.8
Ruralton	1.3	1.2	1.2	1.1	1.0	0.9
Littleton	1.4	1.6	1.5	0.9	0.8	0.7

18. A library is established with a donation of 20,000 volumes. Each year, the library has enough money in its budget to purchase another 325 volumes. Let t be the number of years since the library was established; let N be the number of volumes in the library. Find a linear equation that describes how N varies with t . How many volumes will be in the library after 16 years?
19. Use the Venn diagram, which describes the types of cookies in a bakery, to answer the following questions.



- (a) How many of the chocolate chip cookies do not also have walnuts?
- (b) How many cookies have neither chocolate chips nor walnuts?
- (c) How many cookies do not have walnuts?

20. Determine which description applies to the argument given below.

If Fluffy is a cat, then Fluffy is a mammal.

Fluffy is not a cat.

Therefore, Fluffy is not a mammal.

- (a) Denying the conclusion (b) Affirming the conclusion
 (c) Denying the hypothesis (d) Affirming the hypothesis
 (e) None of these

21. A small college in Georgia has a total of 5,120 students as shown in the following table. What is the probability that a randomly chosen student will *not* be a right-handed male?

	Male	Female
Right-Handed	1,381	3,200
Left-Handed	155	384

22. We wish to invest some money at 3.25% annual interest compounded continuously, and to have \$8,000 after a period of 10 years. How much money should we invest?
23. Let G be the set of households with female children. Let K be the set of households with male children. Are G and K overlapping (that is, each contains some households that are in the other), or is one of the sets a subset of the other, or are they disjoint?
24. The following table shows hours spent watching TV per week and average test grade for a sample of seven students. Use your calculator to find the linear model that best fits this data.

Hours Per Week	3	5	8	10	12	15	16
Average Grade	88	82	68	85	70	65	75

25. The number of people living in Linetown, in thousands, is given in the following table:

Year	1950	1952	1954	1956	1958
Population (Millions)	27.2	24.1	18.5	15.8	12.9

The equation of the line of best fit linear regression model (where $t = 0$ in 1950) is $P(t) = -1.845t + 27.08$, where $P(t)$ is the population, in thousands, at any time, t . Use the table below to compute the Standard Error. [In the process, use 3 decimal places for each prediction and error amount, E^2 value, the SSE, and the standard error.]

Year	$t = \text{year} - 1950$	Actual Population (thousands)	Predicted Population (thousands)	$E = \text{Error} = \text{Actual} - \text{Predicted}$	E^2
1950		27.2			
1952		24.1			
1954		18.5			
1956		15.8			
1958		12.9			

- (a) 1.795 (b) 0.883 (c) 1.505 (d) 0.684

ANSWERS

1. \$119,642
2. Diagrams may vary.
(a) Disjoint sets (b) Overlapping sets (c) Subset (d) Overlapping sets
3. (a) If you stay on the team, then you must attend practice.
(b) If you are in Los Angeles, then you are in California.
(c) If you show up at the party, then you will get a door prize.
(d) If a creature is a monkey, then it is a mammal.
4. (a) inductive reasoning
5. (a) Whole number (b) Integer (c) Rational number (d) Rational number (e) Real number (also, irrational number)
6. (a) 0.375 (b) 0.6875
7. (a) \$4,699.57 (b) \$4,721.64 (c) \$4,726.69 (d) \$4,729.15 (e) \$4,729.23
8. (a) Observational study (b) Experiment without blinding (c) Experiment with double blinding (d) Observational study
9. (a) Stratified sampling (b) Systematic sampling (c) Random sampling (d) Convenience sampling
10. (a) 1995 (b) 1990 (c) 60% (d) 30%
11. (a) Strong positive correlation (b) Weak negative correlation (c) Strong negative correlation (d) No correlation (e) Weak positive correlation
12. (a) 16 students (b) 24 students; (c) 8 students (d) 16 students (e) 8 students
13. $\frac{7}{8}$ or 0.875 14. (a) 1 to 7 (b) 1 to 11 (c) $\frac{11}{36}$ (d) $\frac{3}{26}$
15. (a) Linear; 1539 people (b) Exponential; 27,225 people
(c) Exponential; \$6476.21 (d) Linear; \$1.95
16. 22 years
17. 0.5 people per 100; 0.8 people per 100; 0.8 people per 100.
18. $N = 20,000 + 325t$; 25,200 volumes
19. (a) 15 cookies (b) 7 cookies (c) 22 cookies
20. (c) Denying the hypothesis
21. 0.73027
22. \$5,780.22
23. Overlapping.
24. $y = -1.196x + 87.932$

25.

Year	$t = \text{year} - 1950$	Actual Population (thousands)	Predicted Population (thousands)	$E = \text{Error} = \text{Actual} - \text{Predicted}$	E^2
1950	0	27.2	27.080	0.120	0.014
1952	2	24.1	23.390	0.710	0.504
1954	4	18.5	19.700	-1.200	1.440
1956	6	15.8	16.010	-0.210	0.044
1958	8	12.9	12.320	0.580	0.336

(d) 0.883