

Dr. Henjin Chi

Form B

Final Exam

Name

Key

H. Chi

X. Suppose you want your son's college fund to contain \$200,000 after 16 years. If you can get an APR of 9.6%, compounded monthly, how much should you deposit at the end of each month?

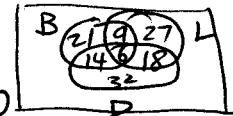
- a. \$521.58 b. \$469.17 c. \$414.25 d. \$431.27 e. \$442.27

2. If the odds against Seattle winning the pennant are 3:2, what is the probability that Seattle will win the pennant?

- a. 2/3 b. 3/8 c. 2/5 d. 3/5 e. None of these

3. In a survey of students who eat dinner at the cafeteria we found that 50 eat breakfast, 60 eat lunch, 70 eat dinner, 15 eat breakfast and lunch, 20 eat breakfast and dinner, 24 eat lunch and dinner, and 6 eat all three meals. How many eat exactly one meal?

- a. 160 b. 70 c. 120 d. 80 e. None of these



21+27+32=80

4. A player plays a game where he tosses three fair coins. He receives \$3.00 if he tosses no heads, \$2.00 if he tosses one head, \$1.00 if he tosses two heads, and \$4.00 if he tosses all three heads. If he plays this game, what is his expected return?

- a. \$1.75 b. \$2.25 c. \$2.00 d. \$2.50 e. \$3.00

1/8 * 3 + 3/8 * 2 + 3/8 * 1 + 1/8 * 4 = 2

5. An item in the grocery store sells for \$5.02. If the markup on the cost of the item is 57%, what is the cost of the item?

- a. \$7.88 b. \$3.00 c. \$3.85 d. \$3.40 e. \$3.20

5.02 = x + 0.57x
x = 5.02 / 1.57 = 3.2

6. Samantha wants to begin saving so she can buy a car when she finishes high school. She has 20 months to save and would like at least \$5,000 for a used car. What is the minimum amount she needs to deposit now at 24% compounded monthly?

- a. \$205.78 b. \$4,354 c. \$5,000 d. \$3,365 e. None of these

P = 5000 / ((1 + 0.24/12)^20) = 3364.86

7. If Brad can mow the lawn in 8 hours and together they can mow the lawn in 6 hours, how long does it take Richard to mow the lawn?

- a. 2 hours b. 14 hours c. 22 hours d. 24 hours e. 20 hours

1/8 + 1/x = 1/6
1/x = 1/6 - 1/8 = 1/24
x = 24

8. If Jennifer invests \$7,600 for 2 years and 8 months at a simple interest rate of 6%, how much interest did she earn?

- a. \$976 b. \$1216 c. \$2216 d. \$1560 e. None of these

I = 7600 * 0.06 * (2 + 8/12) = 1216

9. In how many ways can three girls and three boys be seated in a row if no two boys and no two girls can sit together?

- a. 6 b. 12 c. 36 d. 72 e. None of these

B G B G B G OR G B G B G B 2 * 3! * 3! = 2 * 6 * 6 = 72

10. Convert 235 decimal to base 2.

- a. 111010112 b. 111011012 c. 111110002 d. 100011112 e. None of these

2 | 235
2 | 117 ... 1
2 | 58 ... 1
2 | 29 ... 0
2 | 14 ... 1
2 | 7 ... 0
2 | 3 ... 1
1 ... 1
111010112

11. Find the compounded amount on deposit when \$6,000 has been on deposit for 10 years at 4.5% compounded monthly.

- B $6000 \left(1 + \frac{0.045}{12}\right)^{120} = 9401.96$
 a. \$9,201.96 b. \$9,401.96 c. \$9,601.96 d. \$3,401.96 e. None of these

12. If you have scores of 78, 85, 76, and 77 on your first four exams, what is the minimum grade that you need on the fifth exam (fifth test counts twice as first four tests) in order to have an average of at least 81?

- E $\frac{78 + 85 + 76 + 77 + 2x}{6} = 81 \quad 316 + 2x = 486$
 a. 79 b. 80 c. 84 d. 89 e. 85
 $2x = 170$
 $x = 85$

13. How many different committees of three democrats and two republicans can be chosen from six republicans and seven democrats?

- B $C(7, 3) * C(6, 2) = 35 * 15 = 525$
 a. 1287 b. 525 c. 350 d. 210 e. 420

14. Suppose you have a balance of \$2200 on your credit car, which charges an APR of 24%. If you want to pay off the balance in 24 months, how much should you pay each month? Assume that you charge no additional expenses to the card.

- B $2200 * \frac{0.24}{12} \frac{1}{1 - (1 + \frac{0.24}{12})^{-24}} = 116.32$
 a. \$123.35 b. \$116.32 c. \$98.64 d. \$136.79 e. None of these

15. Based on the roll of a pair of honest dice, what is the probability that you will not roll a 4 nor a 7?

- B $P(\text{not } 4 \cup \text{not } 7) = 1 - P(4) - P(7) + P(4 \cap 7)$
 $P(4) = \frac{3}{36} = \frac{1}{12}$ $P(7) = \frac{6}{36} = \frac{1}{6}$
 $P(4 \cap 7) = 0$
 $P(\text{not } 4 \cup \text{not } 7) = 1 - \frac{1}{12} - \frac{1}{6} = \frac{3}{4}$
 a. $\frac{1}{9}$ b. $\frac{3}{4}$ c. $\frac{1}{6}$ d. $\frac{1}{4}$ e. None of these

16. If you buy a television for \$1000, pay \$100 dollars down and the balance in 24 equal monthly payments at 12% simple interest, how much is the monthly payment?

- A $900 + 900 * 0.12 * \frac{24}{12} = 465$
 a. \$46.50 b. \$45.00 c. \$47.62 d. \$37.50 e. None of these

17. How many different words can we form using all of the letters in INDIANA?

- C $\frac{7!}{2!2!2!} = 630$
 a. 5040 b. 210 c. 650 d. 504 e. 630

18. Two movie theaters run movies continuously and each starts its first feature at 1:00 p.m. If the first movie runs for 120 minutes and the second movie runs for 90 minutes, when will the movies begin again at the same time?

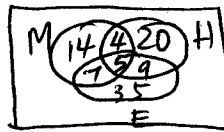
- C $\text{lcm}(120, 90) = 360 = 6 \text{ hours}$
 a. 3:00 p.m. b. 4:00 p.m. c. 7:00 p.m. d. 6:00 p.m. e. 5:00 p.m.

19. How much candy that sells at 80 cents per bag must be added to 10 bags of candy that sells for \$1.60 per bag in order to obtain candy that will sell for \$1.00 per bag?

- C $80 * x + 1.6 * 10 = (x + 10) * 1.0 \rightarrow x = 30$
 a. 40 bags b. 25 bags c. 30 bags d. 35 bags e. 45 bags

20. If you deposit \$100 a month in an annuity that earns 9.3% compounded monthly for a period of 15 years, how much money will you have in the annuity?

- ~~a. \$38,881.72 b. \$36,675.34 c. \$41,234.67 d. \$28,881.72 e. None of these~~



21. A survey of a group of students shows that 56 of the students are enrolled in English, 38 in History, 30 in Mathematics, 14 in English and History, 12 in English and Mathematics, 9 in History and Mathematics, and 5 in all three. How many are taking History and Mathematics but not English?
 a. 14 b. 21 **c. 38** d. 18 $14+4+20 = 38$ e. 4

22. A new car comes in a choice of seven colors, 2-door or 4-door, with or without a sun-roof, with cassette-radio, CD-radio, or cassette-CD-radio. How many different choices do we have for our car?
A **a. 84 choices** b. 42 choices $7 \times 2 \times 2 \times 3 = 84$ c. 168 choices d. 36 choices e. 56 choices

23. Suppose that you apply for a 7-year loan in the amount of \$17,000 with an APR of 10%. Your monthly payment is \$288.22. Determine the total amount of interest paid over the seven years.
E a. \$24,210.48 b. \$17,134.64 c. \$9706.48 d. \$6706.48 **e. None of these**

24. Two cities are 512 kilometers apart. Convert this distance to miles.
A **a. 320.0** b. 512.0 c. 819.2 d. 468.2 e. None of these

25. Testing indicates that the lifetimes of a new shipment of 500 storage batteries are approximately normally distributed with a mean of 2.5 years and a standard deviation of 0.4 year. How many of the storage batteries will last 2.1 years to 3.1 years?
D a. 452 b. 866 c. 433 **d. 387** e. None of these

26. Suppose a data set has a mean of 235 and a standard deviation of 12. Find the z-score for the data value of 217.
E a. 1.5 b. 2 $z_{217} = \frac{217-235}{12} = -1.5$ c. 0 d. -2 **e. -1.5**

27. The average person has an IQ of 110, and scores are normally distributed with a standard deviation of 15 points. What percentage of people has an IQ above 95?
C a. 34.46% b. 68.92% **c. 84.13%** d. 15.87% e. None of these

28. Suppose that in a company with 10,000 employees, the monthly salaries are normally distributed. The mean salary is \$3,400, with a standard deviation of \$300. About how many of the employees earn more than \$3,280 per month?
B a. 3,446 **b. 6,554** c. 5,000 d. 6,915 e. None of these

29. Homer Simpson buys a home entertainment center costing \$900. He pays \$50 down and the rest in 6 monthly payments. The finance charge is 9% simple interest. What is the amount of each payment?
D a. \$148.04 b. \$173.28 c. \$143.68 **d. \$154.42** e. None of these

30. The Clover 4-H club is running a raffle in which the price for the winning ticket is \$200. If 400 ticket are sold at \$4 each, what is the expectation for George, who buys 8 tickets?
B a. \$0.50 **b. \$4.00** c. \$1.50 d. \$2.00 e. None of these

$\frac{8}{400} * 200 = \$4.00$

$$8 \times 7 \times 6 = 336$$

$$53 \square \square \square$$

31. A primary zip code is a five-digit numeral. In a certain city, the first and second digits must be 5 and 3, respectively. How many zip code can be formed if NO repetition of any digits is allowed?
- B a. 720 **b. 336** c. 512 d. 1000 e. 840

Use the following to answer problems 30 and 31; Bush purchase a house for \$17,000,000.00. He made a down payment of 10% and borrows the remainder at 5% interest rate for 30 years.

$$17000000 - 17000000 * 10\% = 15,300,000$$

32. What is the monthly payment? (To the closed \$100 dollars) $PMT = 15300000 * \frac{0.05}{12} / (1 - (1 + \frac{0.05}{12})^{-360})$

- C a. \$75,926 b. \$50,356 **c. \$82,134** d. \$62,835 e. None of these

33. How much interest will he pay? $82,134 * 12 * 30 - 17,000,000 = 12,568,240$

- D a. \$7,320,442. b. \$10,333,360. c. \$14,268,136. **d. 12,568,240** e. None of these

Problem 34-37 use the following sets: the universe $U = \{1,2,3,4,5,6,7,8,9,0\}$, and $A = \{1,3,5,7,9\}$, and $B = \{2,3,4,5,7\}$

- E 34. Compute $A - B = \{1, 9\}$

- a. \emptyset b. $\{1,2,3,4,5\}$ c. $\{1,3,5,7,9\}$ d. $\{2,3,4,5,7\}$ **e. $\{1,9\}$**

- B 35. Compute $A \cap B = \{3, 5, 7\}$

- a. \emptyset **b. $\{3,7,5\}$** c. $\{1,3,5,7,9\}$ d. $\{2,3,4,5,7\}$ e. $\{1,9\}$

- D 36. Compute $B' = \{1, 6, 8, 9, 0\}$

- a. $\{1,6,9\}$ b. $\{1,3,5,7,9\}$ c. $\{2,3,4,5,7\}$ **d. $\{1,0,6,8,9\}$** e. None of these

- B 37. Compute $A' \cap B'$. $A' = \{2, 4, 6, 8, 0\}$ $B' = \{1, 6, 8, 9, 0\}$ $A' \cap B' = \{6, 8, 0\}$

- a. \emptyset **b. $\{0,6,8\}$** c. $\{1,3,5,7,9\}$ d. $\{1,2,4,6,8,9,0\}$ e. None of these

- A 38. Bob sells a bag of popcorn for \$1.60. His markup is 300% of his cost. What is his cost?

- a. 40 cents** b. 30 cents c. 50 cents d. 80 cents e. \$4.80

$$C + 300\% * C = 1.6 \quad C = \frac{1.6}{4} = 0.4 = 40¢$$

- E 39. Convert 1234_5 to a base 10 number. $1 * 5^3 + 2 * 5^2 + 3 * 5 + 4 = 125 + 50 + 15 + 4 = 194$

- a. 1234 b. 55 c. 14414 d. 245 **e. 194**

- D 40. Set $A = \{1,2,3\}$, and set $B = \{a,b\}$. Compute $B \times A$.

- a. $\{1,2,3\}$ b. $\{(1,a),(1,b),(2,a),(2,b),(3,a),(3,b)\}$ c. $\{(1,a),(3,b)\}$
d. $\{(a,1),(a,2),(a,3),(b,1),(b,2),(b,3)\}$ e. $\{(1,1),(2,2),(3,3)\}$

41. A pair of dice are tossed. What is the probability that at least one of the dice is a 5? *use table*

- D a. $\frac{1}{5}$ b. $\frac{5}{36}$ c. $\frac{1}{9}$ **d. $\frac{11}{36}$** e. $\frac{1}{3}$

42. Convert 68°C to degrees Fahrenheit.

$$68 * \frac{9}{5} + 32 = 154.4^{\circ}\text{F}$$

- a. 20°F b. 68°F c. 154.4°F d. 168.6°F e. None of these

43. If 476 scientists at a conference comprise 85% of all people at the conference, how many people are at the conference?

- a. 560 b. 405 c. 630 d. 476 e. None of these

44. A bag contains color balls: 13 white, 5 blue, 1 red, and 1 black. If the player chooses one of the white balls the player receives nothing. If a blue ball is selected, the player wins \$1, the red ball wins \$5, and the black ball wins \$10. What is the "fair" price to play a game with these odds and winnings?

- a. \$0.80 b. \$1.00 c. \$10.00 d. \$5.00 e. \$2.00

45. The dance line advisor must choose two girls out of 15 members to present an award at the assembly. How many ways can the girl be selected?

- a. 15 b. 30 c. 210 d. 105 e. 60

46. The heights of the football players in a college are found to be approximately normally distributed with a mean of 6 ft. and a standard deviation of 3 inches. What percentage of the players are between 69 inches to 78 inches?

- a. 94% b. 81.8% c. 34.1% d. 68.2% e. 95.4%

$$z_{69} = \frac{69-72}{3} = -1 \quad z_{78} = \frac{78-72}{3} = 2 \quad 0.341 + 0.477 = 0.818$$

47. Given that the events A and B are independent, and $P(A)=0.8$ and $P(B)=0.6$, find the probability of A but not B, that is $P(A \text{ and not } B)$.

- a. 0.48 b. 0.32 c. 0.6 d. 0.8 e. None of these

$$P(A \cap B') = P(A) * P(B') = 0.8 * 0.4 = 0.32$$

Statistics: Answer problem 48-50 using the following data set: 7, 13, 17, 19, 23, 29, 32

48. Find the standard deviation.

- a. 4 b. 462 c. 66 d. 8.1 e. 3262

DNA

49. What is the percentile of 23?

- a. 71 b. 19 c. 57 d. 3 e. 42

$$\frac{4}{7} * 100\% = 57\%$$

50. Find the third Quartile.

- a. 23 b. 29 c. 13 d. 17 e. 19