118 = HW ID MATH 116 Ch 1  Name:_____

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

1. The following table is used in several questions

| Number of Voters | 8 | 27 | 2 | 19 | 15 |
|---|---|---|---|---|---|
| 1st choice | C | D | A | A | B |
| 2nd choice | B | C | B | C | A |
| 3rd choice | A | A | C | B | C |
| 4th choice | D | B | D | D | D |

Using the plurality method, which candidate wins the election?
A) A B) B C) C D) D E) None of the above

2. Using the plurality with elimination method, which candidate wins the election?
A) A B) B C) C D) D E) None of the above

3. Using the Borda count method, which candidate wins the election?
A) A B) B C) C D) D E) None of the above

4. Using the method of pairwise comparisons, which candidate wins the election?
A) A B) B C) C D) D E) None of the above

5. The Condorcet candidate in this election is
A) A B) B C) C D) D E) None of the above

6. Using the extended plurality-with-elimination ranking method, which candidate comes in second place?
A) A B) B C) C D) D E) None of the above

7. Using the extended pairwise comparisons ranking method, which candidate comes in second place?
A) A B) B C) C D) D E) None of the above

8. Using the extended Borda count method ranking method which candidate comes in third place?
A) A B) B C) C D) D E) None of the above

9. Using the recursive plurality ranking method, which candidate comes in second place?
A) A B) B C) C D) D E) None of the above

10. Using the recursive Borda count method, which candidate comes in second place?
A) A B) B C) C D) D E) None of the above

11. Using the recursive plurality with elimination ranking method, which candidate comes in third place?
A) A B) B C) C D) D E) None of the above

12. What is the total number of pairwise comparisons in an election with 31 candidates?
A) 465 B) 510 C) 555 D) 600 E) 645

13. In an election among 3 candidates (A,B, and C) there are 20 voters. Using the Borda count method, if candidate A received 43 points and candidate B received 58 points then how many points did candidate C receive?
A) 19 B) 21 C) 23 D) 25 E) 27

14. An election with 7 candidates is held using the plurality method. If there are 485 voters and candidate B wins then B must have received **at least** how many first-place votes?
A) 70 B) 71 C) 72 D) 73 E) 74

15. Evaluate the sums $1+2+3+\cdots+63$ and $1+2+3+\cdots+114$. The sum $64+65+\cdots+114$ is equal to
A) 3839 B) 4189 C) 4539 D) 4889 E) 5239

118 = HW ID  MATH 116  Chapter 15    Name:_____

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

1. A license plate with 5 characters is made up using only capital letters A through Z and the digits 0 through 7. How many license plates are possible?
A) 45435424  B) 49935424  C) 54435424  D) 58935424  E) 63435424

2. A license plate with 6 characters is made up using only capital letters A through Z and the digits 0 through 7. How many license plates have neither a 6 nor a K in them?
A) 983741824  B) 1073741824  C) 1163741824  D) 1253741824  E) 1343741824

3. A license plate with 6 characters is made up using only capital letters A through Z and the digits 0 through 5. How many license plates have no digits or letters repeating (that is, 4L2KL3 would not be allowed)?
A) 602458240  B) 652458240  C) 702458240  D) 752458240  E) 802458240

4. There are 5 men and 3 women in line to board a bus. How many ways can they line up?
A) 40320  B) 44320  C) 48320  D) 52320  E) 56320

5. There are 4 men and 5 women in line to board a bus. How many ways can they line up if the first person in line must be a woman?
A) 201600  B) 221600  C) 241600  D) 261600  E) 281600

6. There are 5 men and 5 women in line to board a bus. How many ways can they line up if the line begins with a woman and then alternates between men and women (that is, WMWM...)?
A) 13400  B) 14400  C) 15400  D) 16400  E) 17400

7. A club has 12 members. How many ways can one choose a committee with 4 members?
A) 415  B) 455  C) 495  D) 535  E) 575

8. 15 teams are ranked. How many different ways are there of choosing first-, second- and third-ranked teams?
A) 2530  B) 2730  C) 2930  D) 3130  E) 3330

9. Evaluate ${}_{12}P_2 + {}_{11}C_6 + {}_{74}P_2 + {}_{252}C_{251}$.
A) 6248  B) 6848  C) 7448  D) 8048  E) 8648

~~10. A circular spinner has 5 colored regions. The blue region is a sector (wedge) with a 123° angle. The red region has a 78° angle and the green, yellow and violet regions split up the remainder of the circle equally. Determine the probabilities of each outcome. Pr(green) ≈~~
~~A) 0.137  B) 0.147  C) 0.157  D) 0.167  E) 0.177~~

11. A fair coin is tossed 3 times. Determine the probability of getting exactly 2 heads.
A) 0.300  B) 0.325  C) 0.350  D) 0.375  E) 0.400

12. Roll 2 fair dice. What is the probability that the total is 7? Hint: it helps to make a table of outcomes.
A) $\frac{3}{36}$  B) $\frac{4}{36}$  C) $\frac{5}{36}$  D) $\frac{6}{36}$  E) $\frac{7}{36}$

13. Roll 2 fair dice. What is the probability that the total is 4 or less?
A) $\frac{3}{36}$  B) $\frac{4}{36}$  C) $\frac{5}{36}$  D) $\frac{6}{36}$  E) $\frac{7}{36}$

14. Randomly choose 2 cards from a standard 52-card deck. What is the probability of picking a pair of queens?
A) 0.0033  B) 0.0036  C) 0.0039  D) 0.0042  E) 0.0045

15. Randomly choose 2 cards from a standard 52-card deck. What is the probability of NOT getting a pair?
A) 0.9402  B) 0.9412  C) 0.9422  D) 0.9432  E) 0.9442

16. Randomly choose 3 cards from a standard 52-card deck. What is the probability that all cards in your hand have different suits?
A) 0.1055  B) 0.2055  C) 0.3226  D) 0.3476  E) 0.3976

~~17. Find the odds in favor of an event $E$ with Pr(E) = 7/10.~~
~~A) 7 to 1  B) 7 to 2  C) 7 to 3  D) 7 to 4  E) 7 to 5~~

~~18. Find the odds in favor of a total of 9 when rolling 2 fair dice.~~
~~A) 1 to 5  B) 5 to 31  C) 1 to 8  D) 1 to 11  E) 1 to 17~~

~~19. The odds in favor of an event $E$ are 5 to 9. Find Pr(E).~~
~~A) 0.257  B) 0.282  C) 0.307  D) 0.332  E) 0.357~~

20. A fair coin is tossed 8 times. Determine the probability of getting exactly 5 tails (round your answer to 4 decimal places).
A) 0.1738  B) 0.1888  C) 0.2038  D) 0.2188  E) 0.2338

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

1.
The information below is used for several questions. It refers to a country with 6 states and there are a total of 51 seats in the legislature. In thousands, the population of state Mello is 10787, of Sartin is 52164, of Ventar is 8441, of Glim is 15318, of Naone is 17595 and of Ancerra is 12995. Determine the state's apportionment under each of the four methods discussed: Hamilton's, Jefferson's, Adams' and Webster's.

What is the apportionment of seats to Sartin using Hamilton's method?
A) 23 B) 24 C) 25 D) 26 E) 27

2. What is the apportionment of seats to Ventar using Hamilton's method?
A) 2 B) 3 C) 4 D) 5 E) 6

3. What is the apportionment of seats to Ancerra using Hamilton's method?
A) 5 B) 6 C) 7 D) 8 E) 9

4. What is the apportionment of seats to Ancerra using Jefferson's method?
A) 2 B) 3 C) 4 D) 5 E) 6

5. What is the apportionment of seats to Ventar using Jefferson's method?
A) 0 B) 1 C) 2 D) 3 E) 4

6. What is the apportionment of seats to Sartin using Jefferson's method?
A) 22 B) 23 C) 24 D) 25 E) 26

7. What is the apportionment of seats to Glim using Jefferson's method?
A) 4 B) 5 C) 6 D) 7 E) 8

8. What is the apportionment of seats to Ancerra using Adams' method?
A) 5 B) 6 C) 7 D) 8 E) 9

9. What is the apportionment of seats to Sartin using Adams' method?
A) 18 B) 19 C) 20 D) 21 E) 22

10. What is the apportionment of seats to Ventar using Adams' method?
A) 1 B) 2 C) 3 D) 4 E) 5

11. What is the apportionment of seats to Naone using Adams' method?
A) 5 B) 6 C) 7 D) 8 E) 9

12. What is the apportionment of seats to Naone using Webster's method?
A) 7 B) 8 C) 9 D) 10 E) 11

13. What is the apportionment of seats to Glim using Webster's method?
A) 3 B) 4 C) 5 D) 6 E) 7

14. What is the apportionment of seats to Sartin using Webster's method?
A) 20 B) 21 C) 22 D) 23 E) 24

15. The following information is used in several questions below.
A hospital has a nursing staff of 251 working in 4 shifts (which we will call $A$, $B$, $C$, and $D$.) The number of nurses apportioned to each shift is based on the average number of patients per shift given as 871 in shift $A$, 1064 in shift $B$, 827 in shift $C$ and 250 in shift $D$. Determine the apportionment of nurses to shifts using Hamilton's, Jefferson's and Adams' method and then answer the questions below.

How many more nurses will be on the $B$ shift than on the $D$ shift if we use Hamilton's method?
A) 65 B) 66 C) 67 D) 68 E) 69

16. How many more nurses will be on the $A$ shift than on the $C$ shift if we use Hamilton's method?
A) -1 B) 0 C) 1 D) 2 E) 3

17. How many more nurses will be on the $B$ shift than on the $D$ shift if we use Jefferson's method?
A) 66 B) 67 C) 68 D) 69 E) 70

18. How many more nurses will be on the $A$ shift than on the $C$ shift if we use Jefferson's method?
A) 1 B) 2 C) 3 D) 4 E) 5

19. How many more nurses will be on the $B$ shift than on the $D$ shift if we use Adams' method?
A) 65 B) 66 C) 67 D) 68 E) 69

20. How many more nurses will be on the $A$ shift than on the $C$ shift if we use Adams' method?
A) 1 B) 2 C) 3 D) 4 E) 5