

Plagiarism will earn you an F in the course and a recommendation of expulsion from the university.

If you are asked to “**Choose all that are correct,**” then in order to receive credit for that question, you **must fill in the bubbles for all of the correct choices.** There is no partial credit. So, if, for example, none of the answers are correct, then don’t choose any – i.e., don’t fill in any bubbles on the bubble sheet. If, for example, three of the answers are correct, then in order to get credit for that question, you must choose the correct three.

1. $T \wedge F =$
 - a. T
 - b. F
2. $T \vee F =$
 - a. F
 - b. T
3. Which of the following are propositions? Choose all that are correct.
 - a. Today is Thursday.
 - b. Today is Friday.
 - c. What day is today?
4. Which of the following are propositions? Choose all that are correct.
 - a. It rained yesterday.
 - b. It will rain tomorrow.
 - c. There are an infinite number of prime numbers.
 - d. 17 is a prime number.
 - e. Two plus two equals five.
5. Which of the following are predicates? Choose all that are correct.
 - a. Let $P(x)$ be defined to be “ x is odd.”
 - b. 17 is a prime number.
 - c. Let $P(x)$ be defined to be “ $\frac{1}{1+x} < 1$.”
 - d. $\frac{1}{3} < 1$.
 - e. There are 15 questions on this exam.
6. $p \otimes q$ is true in the following case(s). Choose all that apply.
 - a. p is true. q can be true or false.
 - b. q is true. p can be true or false.
 - c. p is true and q is false.
 - d. p and q are both true.
 - e. p and q are both false.
7. $\neg p \vee \neg q \equiv \neg(p \wedge \neg q)$
 - a. True
 - b. False
8. $p \wedge q \equiv \neg(p \wedge q)$
 - a. True
 - b. False

9. $A=\{1,5,2,3\}, B=\{1,2,5,3\}$
- $A=B$
 - $A \neq B$
10. $A=\{1,2,3,4,5\}, B=\{1,2,3,4\}$. Choose all that are correct.
- $A \subset B$
 - $B \subset A$
 - $A \subseteq B$
 - $B \subseteq A$
 - $A \not\subseteq B$
11. $A=\{1,2,3,4,5\}, B=\{1,2,3,4,5,6\}$. Choose all that are correct.
- $A \subset B$
 - $B \subset A$
 - $A \subseteq B$
 - $B \subseteq A$
 - $A \not\subseteq B$
12. $A=\{1,2,3,4\}, B=\{1,2,3,4,5\}$. Choose all that are correct.
- $A \cap B = \{2\}$
 - $A \cap B = \{2,3\}$
 - $A \cap B = \{1,2,3,4,5\}$
 - $A \cap B = \{5\}$
 - $A \cap B = \{1,2,3,4\}$
13. $A=\{1,2,3,4\}, B=\{1,2,3,4,5\}$. Choose all that are correct.
- $A \cup B = \{2\}$
 - $A \cup B = \{2,3\}$
 - $A \cup B = \{1,2,3,4,5\}$
 - $A \cup B = \{5\}$
 - $A \cup B = \{1,2,3,4\}$
14. $A = \{1,3,5,7\}, B = \{2,4,6,8\}$. Choose all that are correct.
- $A \cup B = \{\emptyset\}$
 - $A \cup B = \emptyset$
 - $A \cap B = \{\emptyset\}$
 - $A \cap B = \emptyset$
 - $A \neq B$

15. Let $c(x) = x^2$, where x is a positive integer. Choose all that are correct.
- c is neither one-to-one nor onto.
 - c is one-to-one but not onto.
 - c is onto but not one-to-one.
 - c is both one-to-one and onto.
16. Let $c(x) = x^3$, where x is a positive integer. Choose all that are correct.
- c is neither one-to-one nor onto.
 - c is one-to-one but not onto.
 - c is onto but not one-to-one.
 - c is both one-to-one and onto.
17. Choose all that are correct.
- $\lfloor 10.9 \rfloor = 10$
 - $\lceil 10.9 \rceil = 10$
 - $\lfloor 10.1 \rfloor = 10$
 - $\lceil 9.9 \rceil = 10$
 - $\lceil 9.1 \rceil = 10$
18. Choose all that are correct.
- $\lfloor -10.9 \rfloor = -10$
 - $\lceil -10.9 \rceil = -10$
 - $\lfloor -10.1 \rfloor = -10$
 - $\lceil -9.9 \rceil = -10$
 - $\lceil -9.1 \rceil = -10$
19. $(A \cup B) \cup C = A \cup (B \cup C)$ is an example of which law.
- De Morgan's Law
 - Law of Diminishing Returns
 - Associative Law
 - Commutative Law
 - Murphy's Law
20. $\sum_{i=1}^n i$ = which of the following. Choose all that are correct.
- n^2
 - $\frac{n(n+1)}{2}$
 - $\frac{(n-1)(n+1)}{2}$
 - n^3
 - All of the above.

21. Let $X = \{u, v, w, y\}$. Define a function $g: X \rightarrow X$ to be $g = \{(u, v), (v, w), (w, y), (y, u)\}$. What is $g^{-1}(x)$? Choose all that apply.
- $\{(u, w)\}$
 - $\{(y, u), (w, y), (v, w), (u, v)\}$
 - $\{(w, u)\}$
 - $\{(v, u), (w, v), (y, u), (w, y)\}$
 - None of the above
22. $\sum_{j=0}^n 2^j =$
- $2^j + \sum_{j=0}^{n-1} 2^j$
 - $2^{n-1} + \sum_{j=0}^{n-1} 2^j$
 - $2^n + \sum_{j=0}^{n-1} 2^j$
 - $2^n + \sum_{j=0}^n 2^j$
 - $\sum_{j=0}^{n/4} 4^j$
23. What is $7 \times 7 - 7 \div 7$?
- 42 / 7
 - 0
 - 42
 - 50
 - 48
24. Choose all that are arithmetic sequences.
- $\{1, 2, 4, 7, 11, 16\}$
 - $\{5, 4, 6, 3, 7, 2, 8\}$
 - $\{5, -5, 5, -5, 5, -5\}$
 - $\{1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}\}$
 - $\{1, 2, 4, 8, 16, 32, \dots\}$
25. Choose all that are geometric sequences.
- $\{1, 2, 4, 7, 11, 16\}$
 - $\{5, 4, 6, 3, 7, 2, 8\}$
 - $\{5, -5, 5, -5, 5, -5\}$
 - $\{1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}\}$
 - $\{1, 2, 4, 8, 16, 32, \dots\}$

Extra Credit

26. Which of the presidential candidates has Dr. Miller spent time with?
- a. Bernie Sanders
 - b. Hillary Clinton
 - c. Donald Trump
 - d. Ted Cruz
 - e. Marco Rubio.
27. In which city did Dr. Miller found a supercomputing center that, for some time, was the leading academic supercomputing center in the world?
- a. New York
 - b. Chicago
 - c. San Diego
 - d. Cleveland
 - e. None of the above.