

Define a relation  $L$  on the set of positive integers.  $x$  is related to  $y$  if  $x = y^2$ .

1. Which selection describes the relation  $L$ ?  
A. Reflexive      B. Anti-reflexive       C. Neither reflexive nor anti-reflexive.
2. Which selection describes the relation  $L$ ?  
A. Transitive.       B. Not transitive.
3. Which selection describes the relation  $L$ ?  
 A. Anti-symmetric      B. Symmetric      C. Neither symmetric nor anti-symmetric.

Define a relation  $Q$  on the set of positive integers.  $x$  is related to  $y$  if  $y$  is an integer multiple of  $x$  (i.e., there is an integer  $n$  such that  $y = xn$ ).

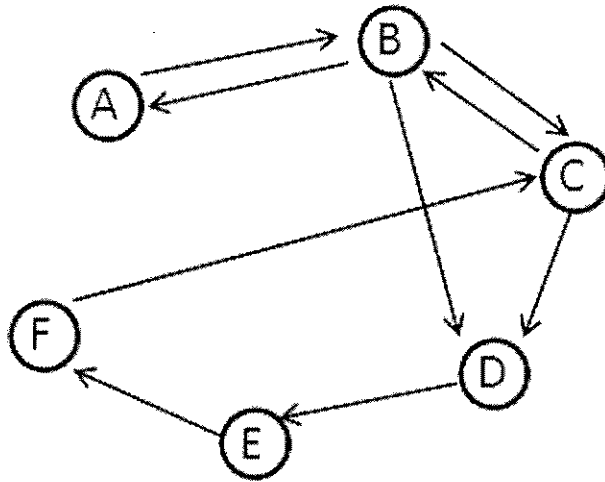
4. Which selection describes the relation  $Q$ ?  
A. Neither reflexive nor anti-reflexive.       B. Reflexive      C. Anti-reflexive
5. Which selection describes the relation  $Q$ ?  
A. Not transitive.       B. Transitive.
6. Which selection describes the relation  $Q$ ?  
 A. Anti-symmetric      B. Neither symmetric nor anti-symmetric.      C. Symmetric

Let  $A$  be a finite, non-empty set. Define a relation  $R$  on the power set of  $A$ . For  $X \in P(A)$  and  $Y \in P(A)$ ,  $X$  is related to  $Y$  if  $X$  is a proper subset of  $Y$  (i.e.,  $X \subset Y$ ).

7. Which selection describes the relation  $R$ ?  
A. Reflexive       B. Anti-reflexive      C. Neither reflexive nor anti-reflexive.
8. Which selection describes the relation  $R$ ?  
A. Not transitive.       B. Transitive.
9. Which selection describes the relation  $R$ ?  
 A. Anti-symmetric      B. Symmetric      C. Neither symmetric nor anti-symmetric.

Let  $A$  be a finite, non-empty set. Define a relation  $S$  on the power set of  $A$ . For  $X \in P(A)$  and  $Y \in P(A)$ ,  $X$  is related to  $Y$  if  $X$  and  $Y$  have the same cardinality (i.e.,  $|X| = |Y|$ ).

10. Which selection describes the relation  $S$ ?  
 A. Reflexive      B. Neither reflexive nor anti-reflexive.      C. Anti-reflexive
11. Which selection describes the relation  $S$ ?  
 A. Transitive.      B. Not transitive.
12. Which selection describes the relation  $S$ ?  
A. Anti-symmetric       B. Symmetric      C. Neither symmetric nor anti-symmetric.



The graph above pictures a relation  $T$  on the set  $\{A, B, C, D, E, F\}$ .

13. Which selection describes the relation  $T$ ?  
 A. Reflexive       B. Anti-reflexive      C. Neither reflexive nor anti-reflexive.
14. Which selection describes the relation  $T$ ?  
 A. Transitive.       B. Not transitive.
15. Which selection describes the relation  $T$ ?  
 A. Symmetric      B. Anti-symmetric       C. Neither symmetric nor anti-symmetric.
16. In graph pictured above, what is the length of the walk  $\langle B, A, B, C, B, D \rangle$ ?  
 A. 5      C. 7  
 B. 6      D. The sequence is not a walk.
17. Which best describes the sequence  $\langle B, C, D, E, F, C, B \rangle$ ?  
 A. A circuit but not a cycle.      C. A path  
 B. A cycle.      D. The sequence is not a walk.
18. Which best describes the sequence  $\langle B, D, E, F, C, B \rangle$ ?  
 A. A circuit but not a cycle.      C. A path  
 B. A cycle.      D. The sequence is not a walk.
19. What is the out-degree of vertex B?  
 A. 0       B. 3  
 B. 2      D. 5