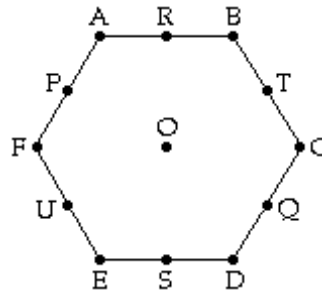


The figure below is a regular hexagon ABCDEF with center O. (P, Q, R, S, T, and U are the midpoints of the sides.)



- Which of the following reflections is not a symmetry of the regular hexagon?
 - the reflection with axis the line passing through A and D
 - the reflection with axis the line passing through A and B
 - the reflection with axis the line passing through R and S
 - the reflection with axis the line passing through P and Q
 - All of the above are symmetries of the regular hexagon.
- Which of the following rotations is not a symmetry of the regular hexagon?
 - a 60° clockwise rotation with center O
 - a 180° clockwise rotation with center O
 - a 120° counterclockwise rotation with center O
 - a 90° clockwise rotation with center O
 - None of the above
- The image of A under the reflection with axis the line passing through B and E is
 - Q.
 - D.
 - T.
 - C.
 - None of the above
- The image of P under the reflection with axis the line passing through A and D is
 - R.
 - T.
 - U.
 - Q.
 - None of the above
- The image of A under a 300° counterclockwise rotation with center O is
 - F.
 - C.
 - B.
 - E.
 - None of the above

6. A translation sends the point A to the point C. The image of F under this translation is

- a) S.
- b) Q.
- c) D.
- d) B.
- e) None of the above

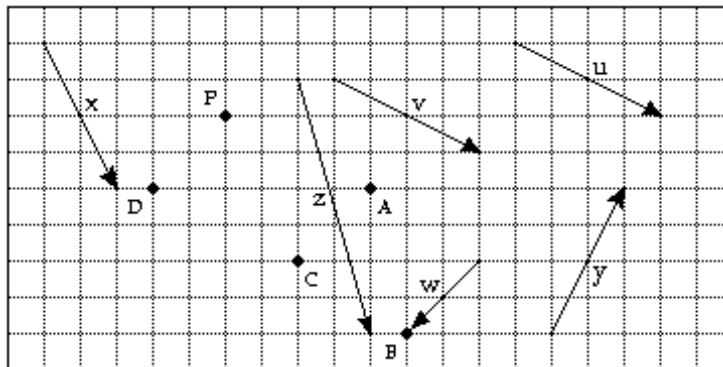
7. A glide reflection sends the point A to the point Q and the point P to the point D. The image of U under this glide reflection is

- a) R.
- b) B.
- c) C.
- d) P.
- e) None of the above

8. A glide reflection sends the point P to the point Q and the point U to the point T. The axis of reflection for this glide reflection is

- a) the line through T and U.
- b) the line through R and S.
- c) the line through C and F.
- d) the line through P and Q.
- e) None of the above

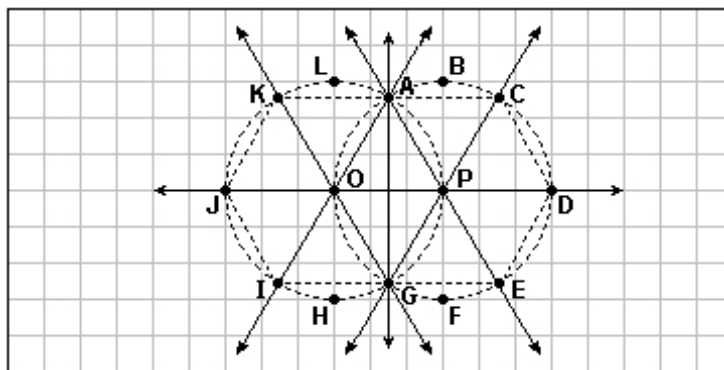
Translation T_1 is determined by vector v and translation T_2 is determined by vector w as shown below.



9. The image of point P under T_1 followed by T_2 is point

- a) A.
- b) B.
- c) C.
- d) D.
- e) None of the above

Use the figure shown below to answer the question(s).



10. Triangle PAC is rotated 120° counterclockwise about the rotocenter P. The image is
- triangle POA.
 - triangle PGO.
 - triangle PDE.
 - triangle PCD.
 - None of the above

Solve the problem.

11. The greek letter Γ (gamma) has symmetry type

- Z_1 .
- Z_2 .
- D_1 .
- D_2 .
- None of the above

12. Which of the following letters has the same symmetry type as the letter X?

- E
- H
- M
- U
- None of the above

13. The symmetry type of an isosceles, nonequilateral triangle is

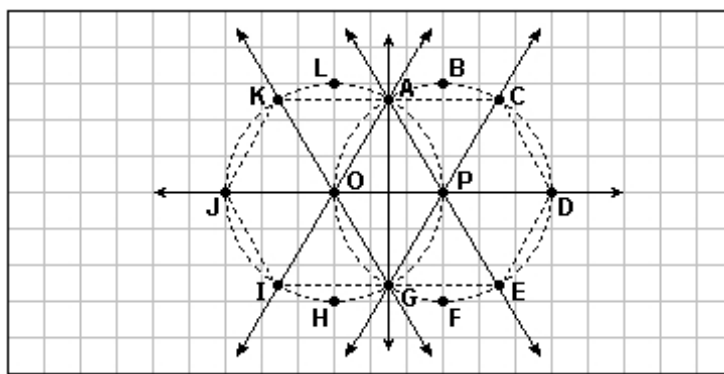
- D_2 .
- Z_2 .
- Z_3 .
- D_1 .
- None of the above

14. If an object has a 30° clockwise rotation as one of its symmetries, then it must also have as a symmetry

- a translation.
- a reflection.
- a 90° clockwise rotation.
- a 45° clockwise rotation.
- None of the above

15. If an object has a 240° clockwise rotation as one of its symmetries, then it must also have as a symmetry
- a 90° counterclockwise rotation.
 - a 180° rotation.
 - a 120° clockwise rotation.
 - a 90° clockwise rotation.
 - None of the above
16. The result of applying three consecutive reflections with respect to two parallel axes is equivalent to a single
- translation.
 - reflection.
 - glide reflection.
 - rotation.
 - None of the above

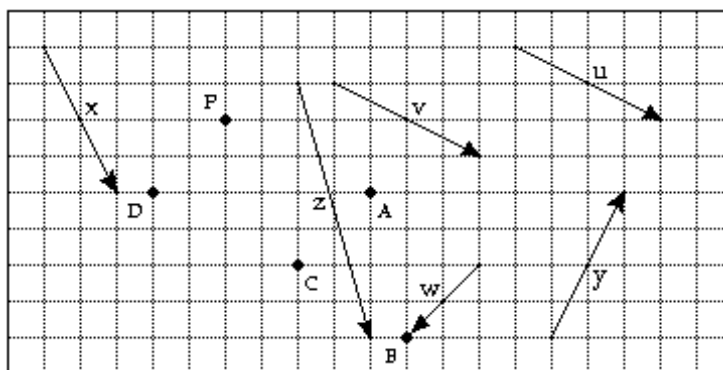
Use the figure shown below to answer the question(s).



17. The image of triangle OKA under a glide reflection is triangle PGE. The image of triangle OIJ under this glide reflection is
- triangle PAC.
 - triangle OKA.
 - triangle DCP.
 - triangle PAO.
 - None of the above
18. Triangle OJK is rotated 60° clockwise about rotocenter O. The result is translated 3 units to the right. The product of this rotation and this translation is
- a translation 6 units to the right
 - a 60° clockwise rotation having rotocenter G.
 - a reflection about the vertical line passing through A and G.
 - a 120° clockwise rotation having rotocenter O.
 - None of the above
19. Find the image of point K under a 7590° clockwise rotation about the rotocenter O.
- P
 - G
 - A
 - L
 - None of the above

20. A rotation is formed by taking the product of a reflection about the line passing through A and I and a reflection about the line passing through A and G. The angle of this rotation is
- 90°.
 - 45°.
 - 30°.
 - 60°.
 - None of the above
21. Point K is reflected about the line passing through points A and I. The result is then reflected about the line through G and K. The image is located at point
- O.
 - J.
 - K.
 - I.
 - None of the above

Translation T_1 is determined by vector v and translation T_2 is determined by vector w as shown below.



22. Translation T_1 followed by translation T_2 determines another translation T_3 . Translation T_3 can be represented by the vector
- z.
 - u.
 - x.
 - y.
 - None of the above

Solve the problem.

23. The result of applying the same glide reflection twice is equivalent to a single
- reflection.
 - translation.
 - glide reflection.
 - rotation.
 - None of the above