Written Exercises

In Exercises 1 and 2 a translation T is described. For each:
a. Graph $\triangle ABC$ and its image $\triangle A'B'C'$. Is $\triangle ABC \cong \triangle A'B'C'$?
b. In color, draw arrows from A to A', B to B', and C to C'.
c. Are your arrows the same length? Are they parallel?

A

1. $T:(x, y) \rightarrow (x - 2, y + 6)$
   $A(-2, 0)$, $B(0, 4)$, $C(3, -1)$

2. $T:(x, y) \rightarrow (x - 3, y - 6)$
   $A(3, 6)$, $B(-3, 6)$, $C(-1, -2)$

3. If $T:(0, 0) \rightarrow (5, 1)$, then $T:(3, 3) \rightarrow (\underline{?}, \underline{?})$.

4. If $T:(1, 1) \rightarrow (3, 0)$, then $T:(0, 0) \rightarrow (\underline{?}, \underline{?})$.

5. If $T:(-2, 3) \rightarrow (2, 6)$, then $T:(\underline{?}, \underline{?}) \rightarrow (0, 0)$.

6. The image of $P(-1, 5)$ under a translation is $P'(5, 7)$. What is the pre-image of P?

In each exercise a glide reflection is described. Graph $\triangle ABC$ and its image under the glide, $\triangle A'B'C'$. Also graph $\triangle A''B''C''$, the image of $\triangle A'B'C'$ under the reflection.

7. Glide: All points move up 4 units.
   Reflection: All points are reflected in the y-axis.
   $A(1, 0)$, $B(4, 2)$, $C(5, 6)$

8. Glide: All points move left 7 units.
   Reflection: All points are reflected in the x-axis.
   $A(4, 2)$, $B(7, 0)$, $C(9, -3)$

B

9. Where does the glide reflection in Exercise 7 map (x, y)?

10. Where does the glide reflection in Exercise 8 map (x, y)?

11. Which of the following properties are invariant under a translation?
    a. distance **b.** angle measure **c.** area **d.** orientation

12. Which of the properties listed in Exercise 11 are invariant under a glide reflection?

In Exercises 13 and 14 translations R and S are described. R maps point P to P', and S maps P' to P''. Find T, the translation that maps P to P''.

13. $R:(x, y) \rightarrow (x + 1, y + 2)$
    $S:(x, y) \rightarrow (x - 5, y + 7)$
    $T:(x, y) \rightarrow (\underline{?}, \underline{?})$

14. $R:(x, y) \rightarrow (x - 5, y - 3)$
    $S:(x, y) \rightarrow (x + 4, y - 6)$
    $T:(x, y) \rightarrow (\underline{?}, \underline{?})$

15. If a translation T maps P to P', then T can be described by the vector $\overrightarrow{PP'}$. Suppose a translation T is described by the vector $(3, -4)$ because it glides all points 3 units right and 4 units down.
    a. Graph points $A(-1, 2)$, $B(0, 6)$, A', and B', where $T(A) = A'$ and $T(B) = B'$.
    b. What kind of figure is $AA'B'B$? What is its perimeter?