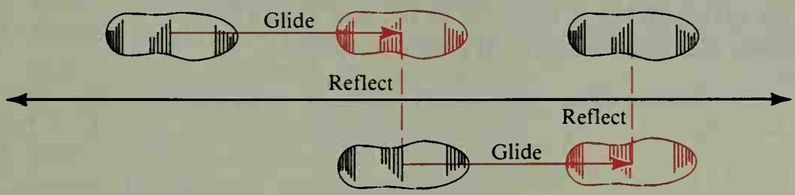
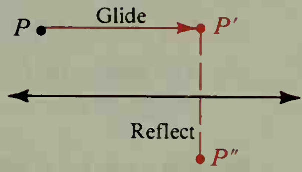
A glide reflection combines two isometries to produce a new transformation, which is itself an isometry. The succession of footprints shown illustrates a glide reflection. Note that the reflection line is parallel to the direction of the glide.



As long as the glide is parallel to the line of reflection, it doesn't matter whether you glide first and then reflect, or reflect first and then glide. For other combinations of mappings, the order in which you perform the mappings will affect the result. We will look further at such combinations of mappings in Section 14-6.



Classroom Exercises

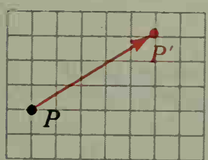
1. Complete each statement for the translation $T:(x, y) \to (x + 3, y - 1)$.
  a. T glides points _?_ units right and 1 unit _?_.
  b. The image of (4, 6) is (_?_, _?_).
  c. The preimage of (2, 3) is (_?_, _?_).

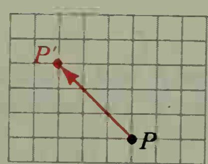
Describe each translation in words, as in Exercise 1(a), and give the image of (4, 6) and the preimage of (2, 3).

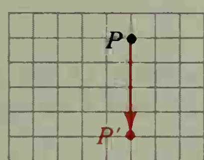
2. $T:(x, y) \to (x - 5, y + 4)$

3. $T:(x, y) \to (x + 1, y)$

Each diagram shows a point P on the coordinate plane and its image P' under a translation T. Complete the statement $T:(x, y) \to$ (_?_, _?_).

4.


5.


6.


7. For a given translation, the image of the origin is (5, 7). What is the preimage of the origin?

8. A glide reflection has the glide translation $T:(x, y) \to (x + 2, y + 2)$. The line of reflection is line m with equation $y = x$.
  a. Find the image, point S', of $S(-1, 3)$ under T.
  b. Find the image, point S'', of S' under R_m. (*Hint*: Recall from the example on page 578 that $R_m:(x, y) \to (y, x)$.)
  c. Under the glide reflection, (x, y) is first mapped to (_?_, _?_) and then to (_?_, _?_).