16. a. Graph $\triangle POQ$ with vertices $P(0, 3)$, $O(0, 0)$, and $Q(6, 0)$.

   b. $T_1:(x, y) \to (x + 2, y - 4)$ and $T_2:(x, y) \to (x + 5, y + 6)$. If $T_1:\triangle POQ \to \triangle P'O'Q'$ and $T_2:\triangle P'O'Q' \to \triangle P''O''Q''$, graph $\triangle P'O'Q'$ and $\triangle P''O''Q''$.

   c. Find T_3, a translation that maps $\triangle POQ$ directly to $\triangle P''O''Q''$.

   d. Because T_1 glides all points 2 units right and 4 units down, the translation can be described by the vector $\overrightarrow{T_1} = (2, -4)$. Describe T_2 and T_3 by vectors. How are these three vectors related?

17. A glide reflection maps $\triangle ABC$ to $\triangle A'B'C'$. Copy the diagram and locate the midpoints of $\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$. What seems to be true about these midpoints? Try to prove your conjecture.
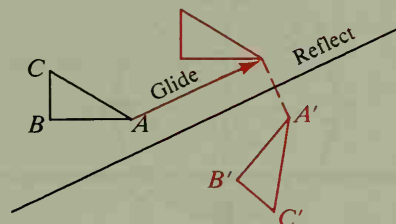

18. Copy the figure and use the result of Exercise 17 to construct the reflecting line of the glide reflection that maps $\triangle ABC$ to $\triangle A'B'C'$. Also construct the glide image of $\triangle ABC$.
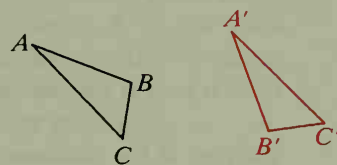
19. Explain why a glide reflection is an isometry.

20. Given $\odot A$ and $\odot B$ and $\overline{CD}$, construct a segment $\overline{XY}$ parallel to and congruent to $\overline{CD}$ and having X on $\odot A$ and Y on $\odot B$. (*Hint:* Translate $\odot A$ along a path parallel to and congruent to $\overline{CD}$.)
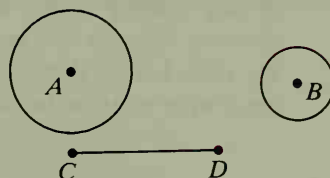
C 21. Describe how you would construct points X and Y, one on each of the lines shown, so that $\overline{XY}$ is parallel to and congruent to $\overline{EF}$.

22. Show by example that if a glide is not parallel to a line of reflection, then the image of a point when the glide is followed by the reflection will be different from the image of the same point when the reflection is followed by the glide.

23. Prove Theorem 14-3 (page 584).