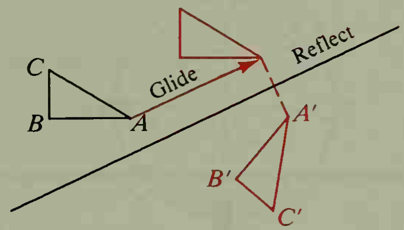
**16.** **a.** Graph $\triangle POQ$ with vertices $P(0, 3)$, $O(0, 0)$, and $Q(6, 0)$.

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

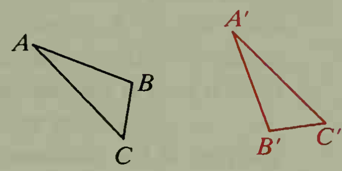
**c.** Find $T_3$, a translation that maps $\triangle POQ$ directly to $\triangle P''O''Q''$.

**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.

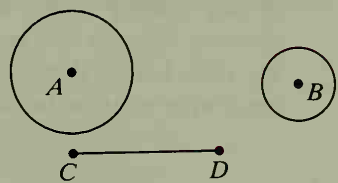



**18.** Copy the figure and use the result of Exercise 17 to construct the reflecting line of the glide reflection that maps $\triangle ABC$ to $\triangle A'B'C'$. Also construct the glide image of $\triangle ABC$.

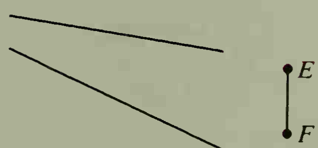



**19.** Explain why a glide reflection is an isometry.

**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).