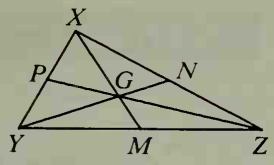
24. G is the intersection of the medians of $\triangle XYZ$. Complete the following statements. (*Hint*: Use Theorem 10-4 on page 387.)

a. $\frac{XG}{XM} = \frac{?}{\quad}$ **b.** $\frac{GM}{GX} = \frac{?}{\quad}$

c. What dilation maps X to M?

d. What is the image under this dilation of Y? of Z?



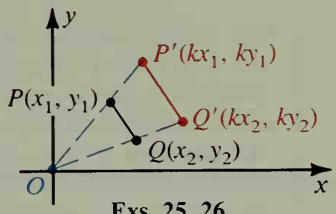
25. $D_{O,\,k}$ maps $\overline{PQ}$ to $\overline{P'Q'}$.

a. Show that the slopes of $\overline{PQ}$ and $\overline{P'Q'}$ are equal.

b. Part (a) proves that $\overline{PQ}$ and $\overline{P'Q'}$ are $\frac{?}{\quad}$.

C **26.** Use the distance formula to show that

$$P'Q' = |k|\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = |k| \cdot PQ.$$



Exs. 25, 26

27. A dilation with center (a, b) and scale factor k maps $A(3, 4)$ to $A'(1, 8)$, and $B(3, 2)$ to $B'(1, 2)$. Find the coordinates of the center (a, b) and the value of k.

28. Prove Theorem 14-5 using the coordinate definition of a dilation, $D_{O,\,k}: (x, y) \rightarrow (kx, ky)$. (*Hint*: Let A, B, and C have coordinates (p, q), (r, s), and (t, u) respectively.)

Self-Test 1

1. Define an isometry.

2. If $f(x) = 3x - 7$, find the image of 2 and the preimage of 2.

3. If $T: (x, y) \rightarrow (x + 1, y - 2)$, find the image and preimage of the origin.

4. Find the image of $(3, 5)$ when reflected in each line.

a. the x-axis **b.** the y-axis **c.** the line $y = x$.

5. A dilation with scale factor 3 maps $\triangle ABC$ to $\triangle A'B'C'$. Which of the following are true?

a. $\overline{AB} \parallel \overline{A'B'}$ **b.** $\frac{A'B'}{AB} = 3$ **c.** $\frac{\text{area of } \triangle A'B'C'}{\text{area of } \triangle ABC} = 3$

6. Give two other names for the rotation $\mathcal{R}_{O,\,-30}$.

Complete. R_x and R_y denote reflections in the x- and y-axes, respectively.

7. $R_y: A \rightarrow \frac{?}{\quad}$ **8.** $R_x: B \rightarrow \frac{?}{\quad}$

9. $R_x: \overline{DC} \rightarrow \frac{?}{\quad}$ **10.** $R_y: \frac{?}{\quad} \rightarrow \overline{OA}$

11. $H_O: K \rightarrow \frac{?}{\quad}$ **12.** $H_O: \frac{?}{\quad} \rightarrow \overline{CO}$

13. $\mathcal{R}_{O,\,90}$ maps M to $\frac{?}{\quad}$. **14.** $\mathcal{R}_{O,\,-90}$ maps $\triangle MCO$ to $\triangle \frac{?}{\quad}$.

15. $D_{O,\,2}$ maps P to $\frac{?}{\quad}$. **16.** $D_{M,\,-\frac{1}{2}}$ maps B to $\frac{?}{\quad}$.

17. A translation that maps A to L maps N to $\frac{?}{\quad}$.

18. The glide reflection in $\overleftrightarrow{BD}$ that maps K to M maps N to $\frac{?}{\quad}$.