35. Extend $\overrightarrow{OF}$ to int. l' at G and let H be the int. of l and l'. $m\angle F'GO = 90 - x$ so $m\angle GHF = 90 - (90 - x) = x$. **37. a.** $\mathcal{R}_{C,\,90}$ **b.** $\overline{AD}$ is the image of $\overline{BE}$ under an isom. **c.** If a rotation of 90° maps $\overline{BE}$ to $\overline{AD}$, then one of the $\measuredangle$ between $\overline{BE}$ and $\overline{AD}$ has meas. 90. (Result from Ex. 35.) **39.** Locate X and Z as you did B and C in Ex. 38, using $\mathcal{R}_{A,\,90}$ instead of $\mathcal{R}_{A,\,60}$. With ctrs. X and Z and radius AX, draw arcs int. at Y.

Mixed Review Exercises, Page 592

1. *ODE*, *OFG* **2.** 2:3 **3.** $x = \frac{9}{2}$, $y = \frac{10}{3}$, $z = 5$, $w = \frac{9}{2}$ **4.** 3:5 **5.** 4:9 **6.** 9:25 **7.** 4:25

Written Exercises, Pages 596–597

1. $A'(12, 0)$, $B'(8, 4)$, $C'(4, -4)$ **3.** $A'(3, 0)$, $B'(2, 1)$, $C'(1, -1)$ **5.** $A'(-12, 0)$, $B'(-8, -4)$, $C'(-4, 4)$ **7.** $A'(6, 0)$, $B'(7, -1)$, $C'(8, 1)$ **9.** 4; expansion **11.** $\frac{1}{3}$; contraction **13.** 4; expansion **15.** b, d **17.** a, b, c **19.** 3:2, 9:4 **21.** 2:1, 4:1 **23. a.** 16:9 **b.** 64:27 **25. a.** Slope of $\overline{PQ} = \frac{y_2 - y_1}{x_2 - x_1}$ = slope of $\overline{P'Q'}$. **b.** $\parallel$ **27.** (4, 2), $k = 3$

Self-Test 1, Page 597

1. An isom. is a one-to-one mapping from the whole plane onto the whole plane that maps every seg. to a $\cong$ seg. **2.** $-1, 3$ **3.** $(1, -2), (-1, 2)$ **4. a.** $(3, -5)$ **b.** $(-3, 5)$ **c.** $(5, 3)$ **5.** a, b **6.** Answers may vary; for example, $\mathcal{R}_{O,\,330}$ **7.** *B* **8.** *C* **9.** $\overline{AB}$ **10.** $\overline{OB}$ **11.** *M* **12.** $\overline{AO}$ **13.** *L* **14.** *NDO* **15.** *C* **16.** *Q* **17.** *C* **18.** *L*

Written Exercises, Pages 603–605

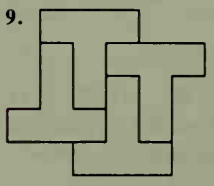
1. a. 1 **b.** $2x^2 - 7$ **c.** 9 **d.** $(2x - 7)^2$ **3. a.** 8 **b.** 27 **c.** $\left(\frac{x+1}{2}\right)^3$ **d.** 14 **e.** 63 **f.** $\frac{x^3+1}{2}$ **11. a.** *Q* **b.** *S* **c.** *M* **d.** *Q* **e.** *Q* **13.** b **15.** a, b, c, d **17.** $(-3, -1)$ **19.** $(9, 2)$ **21.** $(4, -8)$ **23.** $(3, -3)$ **25. a.** $Q(-2, 5)$ **b.** 90 **c.** slope of $\overline{OP} = \frac{2}{5}$, slope of $\overline{OQ} = -\frac{5}{2}$; $\frac{2}{5}\left(-\frac{5}{2}\right) = -1$ **d.** $(-y, x)$, $(y, -x)$ **27.** Construct B' so that k is the $\perp$ bisector of $\overline{BB'}$. Construct line j, the $\perp$ bis. of $\overline{AB'}$. **29.** translation

Written Exercises, Pages 607–608

1. $\frac{1}{4}$ **3.** $\frac{3}{2}$ **5.** *C* **7.** *A* **9.** *C* **11.** *A* **13.** *C* **15.** *I* **17.** H_O **19.** $(x + 6, y - 8)$ **21.** $S^{-1}:(x, y) \to (x - 5, y - 2)$ **23.** $S^{-1}:(x, y) \to \left(\frac{1}{3}x, -2y\right)$ **25.** $S^{-1}:(x, y) \to \left(x + 4, \frac{1}{4}y\right)$ **27.** $T:(x, y) \to \left(x + 2, y - \frac{1}{2}\right)$ **29. a.** 2 units rt., 2 units left

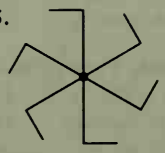
Written Exercises, Pages 612–614

1. a. 5 **b.** No **c.** $\mathcal{R}_{O,\,72}$, $\mathcal{R}_{O,\,144}$, $\mathcal{R}_{O,\,216}$, $\mathcal{R}_{O,\,288}$ **3. a.** 4 **b.** Yes **c.** $\mathcal{R}_{O,\,90}$, $\mathcal{R}_{O,\,180}$, $\mathcal{R}_{O,\,270}$ **5.** A, B, C, D, E, K, M, T, U, V, W, Y **7.** H, I, N, O, S, X, Z

9. 

11. 

13. 

15. 

17. 

19. a. The ellipse has line symm. about two axes and pt. symm. about the int. of the axes. **b.** If $a = b$, the ellipse becomes a $\odot$ and the solid formed is a sphere with vol. $\frac{4}{3}\pi a^3$. **c.** The ellipsoid has plane symm. about the