21. a. Key steps of proof: 1. $\overline{AB} \cong \overline{AC}$; $\overline{BD} \perp \overline{AC}$; $\overline{CE} \perp \overline{AB}$ (Given) 2. $\triangle ADB \cong \triangle AEC$ (AAS) 3. $\overline{BD} \cong \overline{CE}$ (CPCT) **b.** The altitudes drawn to the legs of an isos. $\triangle$ are $\cong$. **23.** Q is on the $\perp$ bis. of $\overline{PS}$, so $PQ = SQ$. S is on the $\perp$ bis. of $\overline{QT}$, so $QS = TS$. Then $PQ = TS$ by the Trans. Prop. **25. a.** $\overline{OD}$ is a $\perp$ bis. of $\overline{AB}$, so $\overline{AD} \cong \overline{BD}$. **b.** $\overline{OC}$ is a $\perp$ bis. of $\overline{AB}$, so $\overline{AC} \cong \overline{BC}$. **c.** By parts (a) and (b) above, $\overline{AD} \cong \overline{BD}$ and $\overline{AC} \cong \overline{BC}$. Then since $\overline{CD} \cong \overline{CD}$, $\triangle CAD \cong \triangle CBD$ by SSS and $\angle CAD \cong \angle CBD$ (CPCT).

Self-Test 3, Page 159

1. $\overline{EA} \cong \overline{DB}$ and $\angle AEB \cong \angle BDA$ **2.** 1. $\triangle MPQ \cong \triangle PMN$ (Given) 2. $\overline{MN} \cong \overline{QP}$; $\angle MPQ \cong \angle PMN$ (CPCT) 3. $\overline{MS} \cong \overline{PR}$ (Given) 4. $\triangle MSN \cong \triangle PRQ$ (SAS) **3. a.** $\overline{LJ}$ or $\overline{KJ}$ **b.** $\overline{KZ}$ **4.** No **5.** If a pt. lies on the bis. of an $\angle$, then the pt. is equidistant from the sides of the $\angle$. **6.** If a pt. is equidistant from the endpts. of a seg., then the pt. lies on the $\perp$ bis. of the seg.

Chapter Review, Pages 160–161

1. $\triangle QPR$ **3.** $\angle W$ **5.** Yes; SSS **7.** Yes; ASA **9.** 1. $\overline{JM} \cong \overline{LM}$; $\overline{JK} \cong \overline{LK}$ (Given) 2. $\overline{MK} \cong \overline{MK}$ (Refl. Prop.) 3. $\triangle MJK \cong \triangle MLK$ (SSS) 4. $\angle MJK \cong \angle MLK$ (CPCT) **11.** $\overline{ER}$, $\overline{EV}$ **13.** 25 **15.** 1. $\overline{GH} \perp \overline{HJ}$; $\overline{KJ} \perp \overline{HJ}$ (Given) 2. $m\angle GHJ = 90$; $m\angle KJH = 90$ (Def. of $\perp$ lines) 3. $\angle GHJ \cong \angle KJH$ (Def. of $\cong$ $\measuredangle$) 4. $\angle G \cong \angle K$ (Given) 5. $\overline{HJ} \cong \overline{HJ}$ (Refl. Prop.) 6. $\triangle GHJ \cong \triangle KJH$ (AAS) **17.** 1. ASA 2. CPCT 3. HL 4. CPCT 5. If 2 lines are cut by a trans. and alt. int. $\measuredangle$ are $\cong$, then the lines are $\parallel$. **19.** If a pt. lies on the $\perp$ bis. of a seg., then the pt. is equidistant from the endpts. of the seg.

Algebra Review, Page 163

1. $-6, 1$ **3.** $-2, 9$ **5.** $0, 13$ **7.** $-13, 13$ **9.** $-0.2, 0.2$ **11.** 3 **13.** $-6, -2$ **15.** 5 **17.** $-4, 5$ **19.** $\frac{-3 \pm \sqrt{57}}{6}$ **21.** $\frac{-5 \pm \sqrt{17}}{2}$ **23.** $\frac{5 \pm \sqrt{13}}{2}$ **25.** 1, 9 **27.** $-7, 2$ **29.** 20 **31.** 1 **33.** 1.5

Preparing for College Entrance Exams, Page 164

1. A **2.** C **3.** D **4.** C **5.** B **6.** C **7.** E **8.** D **9.** B

Cumulative Review, Page 165

1. Seg. Add. Post. **3.** obtuse **5.** 16 **7.** 10 **9.** SSS **11.** $m\angle 5 = 90$, $m\angle 6 = 54$, $m\angle 7 = 36$, $m\angle 8 = 54$ **13.** No **15.** Yes; $a \parallel b$ **17.** Key steps of proof: 1. $\overline{MO} \perp \overline{NP}$, $\overline{NO} \cong \overline{PO}$ (Given) 2. $\triangle NQO \cong \triangle PQO$ (HL) 3. $\angle NOQ \cong \angle POQ$ (CPCT) 4. $\triangle MNO \cong \triangle MPO$ (SAS) 5. $\overline{MN} \cong \overline{MP}$ (CPCT)

Chapter 5

Written Exercises, Pages 169–171

1. $\overline{CR}$, $\overline{CE}$ **3.** $\overline{ER}$, $\overline{RC}$, $\overline{CW}$ **5.** $a = 8$, $b = 10$, $x = 118$, $y = 62$ **7.** $a = 5$, $b = 3$, $x = 120$, $y = 22$ **9.** $a = 8$, $b = 8$, $x = 56$, $y = 68$ **11.** 60 **17.** (3, 2) **19.** $x = 3$, $y = 5$ **21.** $x = 13$, $y = 5$ **23.** $x = 5$, $y = 4$ **25.** 5, 2 **27.** 10, 70 **29.** 1. $PQRS$ is a $\square$; $\overline{PJ} \cong \overline{RK}$ (Given) 2. $\angle P \cong \angle R$ (Thm. 5-2) 3. $\overline{SP} \cong \overline{QR}$ (Thm. 5-1) 4. $\triangle SPJ \cong \triangle QRK$ (SAS) 5. $\overline{SJ} \cong \overline{QK}$ (CPCT) **31.** 1. $ABCD$ is a $\square$; $\overline{CD} \cong \overline{CE}$ (Given) 2. $\overline{AB} \parallel \overline{CD}$ (Def. of $\square$) 3. $\angle CDE \cong \angle A$ (If lines $\parallel$, corr. $\measuredangle \cong$.) 4. $\angle CDE \cong \angle E$ (Isos. $\triangle$ Thm.) 5. $\angle A \cong \angle E$ (Subst.) **35.** (6, 0), (0, 8), (12, 8)

Written Exercises, Pages 174–176

1. Def. of $\square$ **3.** Thm. 5-5 **5.** Thm. 5-6 **7.** Thm. 5-7 **9. a.** Thm. 5-4 **b.** Thm. 5-6 **c.** Thm. 5-7 **15.** $m\angle DAB = m\angle BCD$, so $m\angle NAM = \frac{1}{2}m\angle DAB = \frac{1}{2}m\angle BCD = m\angle NCM$. $m\angle DNA = m\angle NAM = m\angle NCM$, so $\overline{AN}$ and $\overline{CM}$ are $\parallel$. $\overline{CN}$ and $\overline{AM}$ are $\parallel$ because $ABCD$ is a $\square$. Then $AMCN$ is a $\square$, by def. of $\square$. **17.** Draw $\overline{AC}$ int. $\overline{DB}$ at Z. Since $DZ = ZB$ and $DE = FB$, $EZ = DZ - DE = ZB - FB = ZF$. Also, $AZ = ZC$. If the diags. of a quad. bis. each other, then the quad. is a $\square$. So $AFCE$ is a $\square$. **19.** $x = 18$, $y = 14$ **21.** $x = 10$, $y = 2$ **23.** Key steps of proof: 1. $\triangle DAE \cong \triangle BCF$ (AAS) 2. $\overline{DE} \cong \overline{BF}$ (CPCT) 3. $\overline{DE} \parallel \overline{BF}$ (Thm. 3-7) 4. $DEBF$ is a $\square$. (Thm. 5-5)