4. *Sample answer:* dilation with center at the origin and a scale factor of $\frac{1}{2}$ followed by a translation 4 units right and 1 unit down
5. *Sample answer:* reflection in the y-axis followed by a dilation with center at the origin and a scale factor of 2
6. *Sample answer:* dilation with center at the origin and a scale factor of $\frac{1}{3}$ followed by a 90° rotation about the origin

Chapter 5

Maintaining Mathematical Proficiency

1. $M(4, 3)$; about 4.5 units
2. $M(4, -5)$; about 8.2 units
3. $M(-3, -1)$; about 12.2 units
4. $M\left(\frac{17}{2}, -7\right)$; 5 units
5. $x = 3$
6. $r = 5$
7. $n = -2$
8. $t = \frac{1}{2}$

5.1 Explorations

1. **a.** Check students' work.
   b. Check students' work.
   c. 180°
   d. Check students' work; The sum of the measures of the interior angles of a triangle is 180°.
2. **a.** Check students' work.
   b. Check students' work.
   c. Check students' work.
   d. Check students' work; The sum is equal to the measure of the exterior angle.
   e. Check students' work; The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.
3. The sum of the measures of the interior angles of a triangle is 180°, and the measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.
4. The sum of the measures of the two nonadjacent interior angles is 32°, and the measure of the adjacent interior angle is 148°; These are known because of the conjectures made in Explorations 1 and 2.

5.1 Extra Practice

1. obtuse scalene
2. right scalene
3. acute isosceles
4. scalene; right
5. 106°
6. 155°
7. 10°, 80°

5.2 Explorations

1. translation, reflection, rotation; A rigid motion maps each part of a figure to a corresponding part of its image. Because rigid motions preserve length and angle measure, corresponding parts of congruent figures are congruent. In congruent triangles, this means that the corresponding sides and corresponding angles are congruent, which is sufficient to say that the triangles are congruent.
2. **a.** *Sample answer:* a translation 3 units right followed by a reflection in the x-axis
   b. *Sample answer:* a 180° rotation about the origin
   c. *Sample answer:* a 270° counterclockwise rotation about the origin followed by a translation 3 units down
   d. *Sample answer:* a 270° clockwise rotation about the origin followed by a reflection in the x-axis
3. Look at the orientation of the original triangle and decide which rigid motion or composition of rigid motions will result in the same orientation as the second triangle. Then, if necessary, use a translation to move the first triangle so that it coincides with the second.
4. *Sample answer:* a reflection in the y-axis followed by a translation 3 units right and 2 units down

5.2 Extra Practice

1. Corresponding angles: $\angle P \cong \angle S$, $\angle Q \cong \angle T$, $\angle R \cong \angle U$;
   Corresponding sides: $\overline{PQ} \cong \overline{ST}$, $\overline{QR} \cong \overline{TU}$, $\overline{RP} \cong \overline{US}$;
   Sample answer: $\triangle RQP \cong \triangle UTS$
2. Corresponding angles: $\angle A \cong \angle E$, $\angle B \cong \angle F$, $\angle C \cong \angle G$, $\angle D \cong \angle H$;
   Corresponding sides: $\overline{AB} \cong \overline{EF}$, $\overline{BC} \cong \overline{FG}$, $\overline{CD} \cong \overline{GH}$ $\overline{AD} \cong \overline{EH}$;
   Sample answer: $BCDA \cong FGHE$
3. $x = 25$, $y = 2$
4. $x = 6$, $y = 10$
5. From the diagram, $\overline{AB} \cong \overline{BC}$ and $\overline{AD} \cong \overline{CD}$, and $\overline{BD} \cong \overline{BD}$ by the Reflexive Property of Congruence (Thm. 2.1). Also from the diagram, $\angle DAB \cong \angle DCB$, $\angle ADB \cong \angle CDB$, and $\angle DBA \cong \angle DBC$. Because all corresponding parts are congruent, $\triangle ABD \cong \triangle CBD$.
6. From the diagram, $\overline{KL} \cong \overline{GH}$, $\overline{LM} \cong \overline{HI}$, $\overline{MN} \cong \overline{IJ}$, and $\overline{NK} \cong \overline{JG}$. Also from the diagram, $\angle K \cong \angle N \cong \angle G \cong \angle J$, $\angle L \cong \angle H$, and $\angle M \cong \angle I$. Because all corresponding parts are congruent, $KLMN \cong GHIJ$.
7. 33°
8. 46°

5.3 Explorations

1. **a.** Check students' work.
   b. Check students' work.
   c. $BC \approx 1.95$, $m\angle B \approx 98.79°$, $m\angle C \approx 41.21°$
   d. Check students' work; If two sides and the included angle of a triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.
2. The triangles are congruent.
3. Start with two triangles so that two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle. Then show that one triangle can be translated until it coincides with the other triangle by a composition of rigid motions.

5.3 Extra Practice

1.

STATEMENTS	REASONS
1. $\overline{AD} \cong \overline{CD}$	1. Given
2. $\overline{BD} \perp \overline{AC}$	2. Given
3. $\angle BDA \cong \angle BDC$	3. Linear Pair Perpendicular Theorem (Thm. 3.10)
4. $\overline{BD} \cong \overline{BD}$	4. Reflexive Property of Congruence (Thm. 2.1)
5. $\triangle ABD \cong \triangle CBD$	5. SAS Congruence Theorem (Thm. 5.5)

2.

STATEMENTS	REASONS
1. $\overline{JN} \cong \overline{MN}$	1. Given
2. $\overline{NK} \cong \overline{NL}$	2. Given
3. $\angle JNK \cong \angle MNL$	3. Vertical Angles Congruence Theorem (Thm. 2.6)
4. $\triangle JNK \cong \triangle MNL$	4. SAS Congruence Theorem (Thm. 5.5)

3. $\triangle EPF \cong \triangle GPH$; Because all points on a circle are the same distance from the center, $\overline{PE} \cong \overline{PG}$ and $\overline{PF} \cong \overline{PH}$. It is given that $\angle EPF \cong \angle GPH$. So, $\triangle EPF \cong \triangle GPH$ by the SAS Congruence Theorem (Thm. 5.5).
4. $\triangle ACF \cong \triangle DBE$; Because the sides of the regular hexagon are congruent $\overline{AF} \cong \overline{DE}$ and $\overline{CF} \cong \overline{BE}$. Also, because the interior angles of the regular hexagon are congruent and $\overline{CF}$ and $\overline{BE}$ are angle bisectors of $\angle F$ and $\angle E$ respectively, $\angle AFC \cong \angle DEB$. So, $\triangle ACF \cong \triangle DBE$ by the SAS Congruence Theorem (Thm. 5.5).
5. Because $\overline{PS} \parallel \overline{QR}$, you know that $\angle SPR \cong \angle PRQ$ by the Alternate Interior Angles Theorem (Thm. 3.2). Also, by the Reflexive Property of Congruence (Thm 2.1), $\overline{PR} \cong \overline{PR}$. It is given that $\overline{PS} \cong \overline{QR}$, so $\triangle PQR \cong \triangle RST$ by the SAS Congruence Theorem (Thm. 5.5).

5.4 Explorations

1. a. Check students' work.
   b. Check students' work.
   c. Because all points on a circle are the same distance from the center, $\overline{AB} \cong \overline{AC}$.
   d. $\angle B \cong \angle C$
   e. Check students' work; If two sides of a triangle are congruent, then the angles opposite them are congruent.
   f. If two angles of a triangle are congruent, then the sides opposite them are congruent; yes
2. In an isosceles triangle, two sides are congruent, and the angles opposite them are congruent.
3. Draw the angle bisector of the included angle between the congruent sides to divide the given isosceles triangle into two triangles. Use the SAS Congruence Theorem (Thm. 5.5) to show that these two triangles are congruent. Then, use properties of congruent triangles to show that the two angles opposite the shared sides are congruent.

   For the converse, draw the angle bisector of the angle that is not congruent to the other two. This divides the given triangle into two triangles that have two pairs of corresponding congruent angles. The third pair of angles are congruent by the Third Angles Theorem (Thm. 5.4). Also, the angle bisector is congruent to itself by the Reflexive Property of Congruence (Thm. 2.1). So, the triangles are congruent, and the sides opposite the congruent angles in the original triangle are congruent.

5.4 Extra Practice

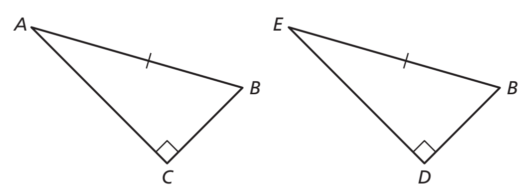
1. J, M; Base Angles Theorem (Thm. 5.6)
2. M, MNL; Base Angles Theorem (Thm. 5.6)
3. NK, NM; Converse of Base Angles Theorem (Thm. 5.7)
4. LJ, LN; Converse of Base Angles Theorem (Thm. 5.7)
5. $x = 31$
6. $x = 30$
7. $x = 50$, $y = 75$
8. $x = 70$, $y = 20$

5.5 Explorations

1. a. Check students' work
   b. Check students' work.
   c. $AB = 2$ because $\overline{AB}$ has one endpoint at the origin and one endpoint on a circle with a radius of 2 units. $AC = 3$ because $\overline{AC}$ has one endpoint at the origin and one endpoint on a circle with a radius of 3 units. $BC = 4$ because it was created that way.
   d. $m\angle A = 104.43°$, $m\angle B = 46.61°$, $m\angle C = 28.96°$
   e. Check students' work; If two triangles have three pairs of congruent sides, then they will have three pairs of congruent angles.
2. The corresponding angles are also congruent.
3. Use rigid transformations to map triangles.

5.5 Extra Practice

1. yes; You are given that $\overline{AB} \cong \overline{ED}$, $\overline{BC} \cong \overline{DC}$, and $\overline{CA} \cong \overline{CE}$. So, $\triangle ABC \cong \triangle EDC$ by the SSS Congruence Theorem (Thm. 5.8).
2. yes; You are given that $\overline{KG} \cong \overline{HJ}$ and $\overline{GH} \cong \overline{JK}$. Also, $\overline{HK} \cong \overline{HK}$ by the Reflexive Property of Congruence (Thm. 2.1). So, $\triangle KGH \cong \triangle HJK$ by the SSS Congruence Theorem (Thm. 5.8).
3. no; You are given that $\overline{UV} \cong \overline{YX}$, $\overline{VW} \cong \overline{XZ}$, and $\overline{WU} \cong \overline{ZY}$. So, $\triangle UVW \cong \triangle YXZ$ by the SSS Congruence Theorem (Thm. 5.8).
4. yes; You are given that $\overline{RS} \cong \overline{RP}$, $\overline{ST} \cong \overline{PQ}$, and $\overline{TR} \cong \overline{QR}$. So, $\triangle RST \cong \triangle RPQ$ by the SSS Congruence Theorem (Thm. 5.8).
5. yes; The diagonal supports in this figure form triangles with fixed side lengths. By the SSS Congruence Theorem (Thm. 5.8), these triangles cannot change shape, so the figure is stable.
6.



STATEMENTS	REASONS
1. B is the midpoint of $\overline{CD}$, $\overline{AB} \cong \overline{EB}$, $\angle C$ and $\angle D$ are right angles.	1. Given
2. $\overline{BC} \cong \overline{BD}$	2. Definition of midpoint
3. $\triangle ABC$ and $\triangle EBD$ are right triangles.	3. Definition of a right triangle
4. $\triangle ABC \cong \triangle EBD$	4. HL Congruence Theorem (Thm. 5.9)

7.

STATEMENTS	REASONS
1. $\overline{IE} \cong \overline{EJ} \cong \overline{JL} \cong \overline{LH} \cong \overline{HK} \cong \overline{KI} \cong \overline{EK} \cong \overline{KF} \cong \overline{FH} \cong \overline{HG} \cong \overline{GL} \cong \overline{LE}$	**1.** Given
2. $EF = EK + KF$, $FG = FH + HG$, $GE = GL + LE$, $HI = HK + KI$, $IJ = IE + EJ$, $JH = JL + LH$	**2.** Segment Addition Postulate (Post. 1.2)
3. $EF = 2EK$, $FG = 2EK$, $GE = 2EK$, $HI = 2EK$, $IJ = 2EK$, $JH = 2EK$	**3.** Substitution Property of Equality
4. $\overline{HI} \cong \overline{EF}$, $\overline{IJ} \cong \overline{FG}$, $\overline{JH} \cong \overline{GE}$	**4.** Transitive Property of Congruence (Thm. 2.1)
5. $\triangle EFG \cong \triangle HIJ$	**5.** SSS Congruence Theorem (Thm. 5.8)

5.6 Explorations

1. **a.** Check students' work.

b. Check students' work.

c. $\overline{AB} \cong \overline{AB}$, $\overline{BD} \cong \overline{BC}$, and $\angle A \cong \angle A$

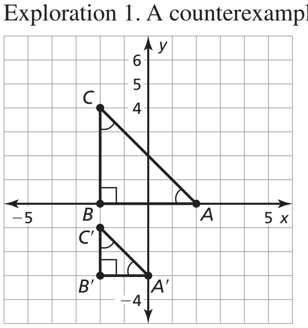
d. no; The third pair of sides are not congruent.

e. no; These two triangles provide a counterexample for SSA. They have two pairs of congruent sides and a pair of nonincluded congruent angles, but the triangles are not congruent.

2.

Possible congruence theorem	Valid or not valid?
SSS	Valid
SSA	Not valid
SAS	Valid
AAS	Valid
ASA	Valid
AAA	Not valid

Sample answer: A counterexample for SSA is given in Exploration 1. A counterexample for AAA is shown here.



In this example, each pair of corresponding angles is congruent, but the corresponding sides are not congruent.

3. In order to determine that two triangles are congruent, one of the following must be true.

All three pairs of corresponding sides are congruent (SSS).

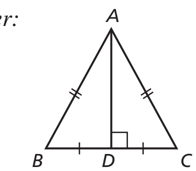
Two pairs of corresponding sides and the pair of included angles are congruent (SAS).

Two pairs of corresponding angles and the pair of included sides are congruent (ASA).

Two pairs of corresponding angles and one pair of nonincluded sides are congruent (AAS).

The hypotenuses and one pair of corresponding legs of two right triangles are congruent (HL).

4. yes; *Sample answer:*



In the diagram, $\triangle ABD \cong \triangle ACD$ by the HL Congruence Theorem (Thm. 5.9), the SSS Congruence Theorem (Thm. 5.8), and the SAS Congruence Theorem (Thm. 5.5).

5.6 Extra Practice

1. yes; AAS Congruence Theorem (Thm. 5.11)

2. yes; ASA Congruence Theorem (Thm. 5.10)

3. no

4. yes; AAS Congruence Theorem (Thm. 5.11)

5. yes; $\triangle LMN \cong \triangle PQR$ by the AAS Congruence Theorem (Thm. 5.11)

6. no; $\angle L$ and $\angle R$ do not correspond.

7.

STATEMENTS	REASONS
1. $\overline{AC}$ bisects $\angle DAB$ and $\angle DCB$.	**1.** Given
2. $\angle CAB \cong \angle CAD$	**2.** Definition of angle bisector
3. $\angle ACB \cong \angle ACD$	**3.** Definition of angle bisector
4. $\overline{AC} \cong \overline{AC}$	**4.** Reflexive Property of Congruence (Thm. 2.2)
5. $\triangle ABC \cong \triangle ADC$	**5.** ASA Congruence Theorem (Thm. 5.10)

8.

STATEMENTS	REASONS
1. O is the center of the circle	**1.** Given
2. $\overline{ON} \cong \overline{OM} \cong \overline{OQ} \cong \overline{OP}$	**2.** All points on a circle are the same distance from the center.
3. $\angle M \cong \angle N \cong \angle P \cong \angle Q$	**3.** Base Angles Theorem (Thm. 5.6)
4. $\triangle MNO \cong \triangle PQO$	**4.** AAS Congruence Theorem (Thm. 5.11)

5.7 Explorations

1. **a.** The surveyor can measure $\overline{DE}$, which will have the same measure as the distance across the river (AB). Because $\triangle ABC \cong \triangle DEC$ by the ASA Congruence Theorem (Thm. 5.10), the corresponding parts of the two triangles are also congruent.

b.

STATEMENTS	REASONS
1. $\overline{AC} \cong \overline{CD}$, $\angle A$ and $\angle D$ are right angles.	**1.** Given
2. $\angle A \cong \angle D$	**2.** Right Angles Congruence Theorem (Thm. 2.3)
3. $\angle ACB \cong \angle DCE$	**3.** Vertical Angles Congruence Theorem (Thm. 2.6)
4. $\triangle ABC \cong \triangle DEC$	**4.** ASA Congruence Theorem (Thm. 5.10)
5. $\overline{AB} \cong \overline{DE}$	**5.** Corresponding parts of congruent triangles are congruent.
6. $AB = DE$	**6.** Definition of congruent segments

c. By creating a triangle on land that is congruent to a triangle that crosses the river, you can find the distance across the river by measuring the distance of the corresponding congruent segment on land.

2. **a.** The officer's height stays the same, he is standing perpendicular to the ground the whole time, and he tipped his hat the same angle in both directions. So, $\triangle DEF \cong \triangle DEG$ by the ASA Congruence Theorem (Thm 5.10). Because corresponding parts of the two triangles are also congruent, $\overline{EG} \cong \overline{EF}$. By the definition of congruent segments, EG equals EF, which is the width of the river.

b.

STATEMENTS	REASONS
1. $\angle EDG \cong \angle EDF$, $\angle DEG$ and $\angle DEF$ are right angles.	**1.** Given
2. $\angle DEG \cong \angle DEF$	**2.** Right Angles Congruence Theorem (Thm. 2.3)
3. $\overline{DE} \cong \overline{DE}$	**3.** Reflexive Property of Congruence (Thm. 2.1)
4. $\triangle DEF \cong \triangle DEG$	**4.** ASA Congruence Theorem (Thm. 5.10)
5. $\overline{EG} \cong \overline{EF}$	**5.** Corresponding parts of congruent triangles are congruent.
6. $EG = EF$	**6.** Definition of congruent segments

c. By standing perpendicular to the ground and using the tip of your hat to gaze at two different points in such a way that the direction of your gaze makes the same angle with your body both times, you can create two congruent triangles, which ensures that you are the same distance from both points.

3. By creating a triangle that is congruent to a triangle with an unknown side length or angle measure, you can measure the created triangle and use it to find the unknown measure indirectly.

4. You do not actually measure the side length or angle measure you are trying to find. You measure the side length or angle measure of a triangle that is congruent to the one you are trying to find.

5.7 Extra Practice

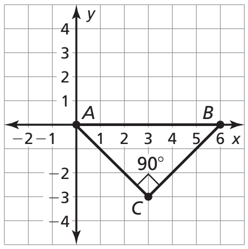
1. From the diagram, $\angle T \cong \angle W$ and $\overline{TV} \cong \overline{WV}$. Also, $\angle UVT \cong \angle XVW$ by the Vertical Angles Congruence Theorem (Thm. 2.6). So, by the ASA Congruence Theorem (Thm. 5.10), $\triangle TUV \cong \triangle WXV$. Because corresponding parts of congruent triangles are congruent, $\overline{UV} \cong \overline{XV}$.
2. The hypotenuses and one pair of legs of the two right triangles are congruent. So, by the HL Congruence Theorem (Thm. 5.9), $\triangle RST \cong \triangle URV$. Because corresponding parts of congruent triangles are congruent, $\overline{TS} \cong \overline{VR}$.
3. From the diagram, $\angle J \cong \angle M$, $\overline{LJ} \cong \overline{LM}$, and $\overline{JK} \cong \overline{MN}$. So, by the SAS Congruence Theorem (Thm. 5.5), $\triangle LJK \cong \triangle LMN$. Because corresponding parts of congruent triangles are congruent, $\angle JLK \cong \angle MLN$.
4. Use the AAS Congruence Theorem (Thm. 5.11) to prove that $\triangle FGI \cong \triangle HIG$. Then, state that $\overline{FG} \cong \overline{HI}$ because corresponding parts of congruent triangles are congruent. Use the ASA Congruence Theorem (Thm. 5.10) to prove that $\triangle FGJ \cong \triangle HIJ$. So $\angle 1 \cong \angle 2$.
5. Use the SSS Congruence Theorem (Thm. 5.8) to prove that $\triangle ABC \cong \triangle ADC$. Then, state that $\angle ACB \cong \angle ACD$ because corresponding parts of congruent triangles are congruent. Use the SAS Congruence Theorem (Thm. 5.5) to prove that $\triangle BCE \cong \triangle DCE$. So, $\angle 1 \cong \angle 2$.
6.

STATEMENTS	REASONS
1. $\overline{AB} \cong \overline{AC}$, $\overline{BD} \cong \overline{CD}$	**1.** Given
2. $\overline{AD} \cong \overline{AD}$	**2.** Reflexive Property of Congruence (Thm. 2.1)
3. $\triangle ABD \cong \triangle ACD$	**3.** SSS Congruence Theorem (Thm. 5.8)
4. $\angle BAD \cong \angle CAD$	**4.** Corresponding parts of congruent triangles are congruent.

5.8 Explorations

1. **a.** Check students' work.
   b. Check students' work.
   c. Check students' work.
   d. Using the Distance Formula, $AC = \sqrt{9 + y^2}$ and $AB = \sqrt{9 + y^2}$. $\overline{AC} \cong \overline{BC}$, so $\triangle ABC$ is an isosceles triangle.

2. a. Check students' work.
   b. Check students' work.
   c. Check students' work; $AC = 3\sqrt{2}$, $m_{\overline{AC}} = 1$, $BC = 3\sqrt{2}$, and $m_{\overline{BC}} = -1$. So, $AC \perp BC$ and $\triangle ABC$ is a right isosceles triangle.
   d. $C(3, -3)$



   e. If C lies on the line $x = 3$, then the coordinates are $C(3, y)$. Because $\triangle ABC$ is an isosceles triangle,

   $m_{\overline{AC}} = \frac{y}{3}$, and $m_{\overline{BC}} = \frac{y}{-3}$.

   $\triangle ABC$ is a right triangle, so it must have a right angle. Because $\overline{AC}$ and $\overline{BC}$ are the congruent legs of $\triangle ABC$, $\angle A$ and $\angle B$ are the congruent base angles by the Base Angles Theorem (Thm. 5.6). The vertex angle, $\angle C$, must be the right angle, which means that $\overline{AC} \perp \overline{BC}$ by definition of perpendicular lines. By the Slopes of Perpendicular Lines Theorem (Thm. 3.14),

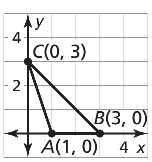
   $\frac{y}{3} \bullet \frac{y}{-3} = -1$ and $y = \pm 3$.

   So, the coordinates of C must be $(3, 3)$ or $(3, -3)$.

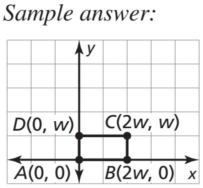
3. You can position the figure in a coordinate plane and then use deductive reasoning to show that what you are trying to prove must be true based on the coordinates of the figure.
4. Using the Distance Formula, $AC = 6$, $AB = 6$, and $BC = 6$. $\overline{AC} \cong \overline{AB} \cong \overline{BC}$, so $\triangle ABC$ is an equilateral triangle.

5.8 Extra Practice

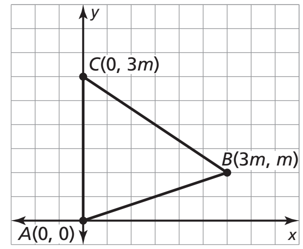
1. *Sample answer:*



   It is easy to find the lengths of horizontal and vertical segments and distances from the origin.
2. *Sample answer:*



   It is easy to find the lengths of horizontal and vertical segments and distances from the origin.
3. Find the lengths of $\overline{RO}$, $\overline{OP}$, $\overline{PQ}$, and $\overline{QR}$ to show that $\overline{RO} \cong \overline{PQ}$ and $\overline{OP} \cong \overline{QR}$.
4. Find the lengths of $\overline{AB}$, $\overline{BD}$, $\overline{OB}$, and $\overline{BC}$ to show that $\overline{AB} \cong \overline{BD}$ and $\overline{OB} \cong \overline{BC}$.
5.



   $AC = 3m$, $m_{\overline{AC}} =$ undefined, $M_{\overline{AC}} = \left(0, \frac{3m}{2}\right)$, $BC = m\sqrt{13}$, $m_{\overline{BC}} = -\frac{2}{3}$, $M_{\overline{BC}} = \left(\frac{3m}{2}, 2m\right)$, $AB = m\sqrt{10}$, $m_{\overline{AB}} = \frac{1}{3}$, $M_{\overline{AB}} = \left(\frac{3m}{2}, \frac{m}{2}\right)$; no; no; Because $m_{\overline{BC}} \cdot m_{\overline{AB}} \neq -1$, $\overline{BC}$ is not perpendicular to $\overline{AB}$ (Thm. 3.14). So $\angle ABC$ is not a right angle. None of the sides are congruent because $AB \neq BC \neq CA$. There are not two or more equal side lengths so $\triangle ABC$ is not an isosceles triangle.
6. $OE = \sqrt{h^2 + k^2}$, $OG = \sqrt{h^2 + k^2}$; $EF = \sqrt{9h^2 + k^2}$, $GF = \sqrt{9h^2 + k^2}$; $FO = 4h$

   So, $\overline{OE} \cong \overline{OG}$, $\overline{EF} \cong \overline{GF}$, $\overline{FO} \cong \overline{FO}$. By SSS Congruence Theorem (Thm. 5.8), $\triangle OEF \cong \triangle OGF$.

Chapter 6

Maintaining Mathematical Proficiency

1. $y = -\frac{1}{2}x + 4\frac{1}{2}$
2. $y = -\frac{1}{6}x + 2\frac{2}{3}$
3. $y = \frac{1}{3}x - \frac{5}{3}$
4. $y = -\frac{1}{3}x + \frac{1}{3}$
5. $y = -x + 13$
6. $y = -4x + 19$
7. $4 \leq g \leq 12$
8. $2 < r < 7$
9. $q \leq 6$ or $q > 1$
10. $p < 17$ or $p \geq 5$
11. $-4 \leq k < 1$

6.1 Explorations

1. a. Check students' work.
   b. Check students' work.
   c. Check students' work (for sample in text, $CA \approx 1.97$, $CB \approx 1.97$); For all locations of C, $\overline{CA}$ and $\overline{CB}$ have the same measure.
   d. Every point on the perpendicular bisector of a segment is equidistant from the endpoints of the segment.
2. a. Check students' work.
   b. Check students' work.
   c. Check students' work (for sample in text, $DE \approx 1.24$, $DF \approx 1.24$); For all locations of D on the angle bisector, $\overline{ED}$ and $\overline{FD}$ have the same measure.
   d. Every point on an angle bisector is equidistant from both sides of the angle.
3. If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment. Every point on the bisector of an angle is equidistant from the sides of the angle.
4. 5 units; Point D is on the angle bisector, so it is equidistant from either side of the angle.