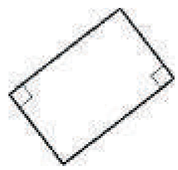
Answer Key

Lesson 8.6

Challenge Practice

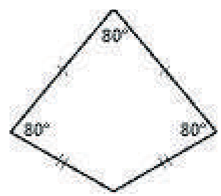
1. True; *Sample answer:* If more than 2 angles were acute, you would no longer have a trapezoid. You would have a quadrilateral.

2. False; *Sample answer:* A rectangle has 2 congruent opposite angles, but is *not* a kite.

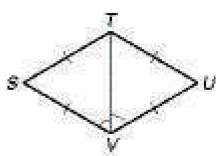


3. True; *Sample answer:* If a quadrilateral has a pair of opposite angles that are congruent, then the quadrilateral is not a trapezoid, it is a kite.

4. False; *Sample answer:* You can have 3 congruent angles and still have a kite.



5. False; *Sample answer:* Although in most cases *STUV* would be a kite, it could also be a rhombus when $\overline{SV} \cong \overline{UV} \cong \overline{ST} \cong \overline{TU}$.



6. Trapezoid; Answers will vary.

7. Rhombus; Answers will vary.

8. Kite; Answers will vary.

9. *Sample Answer:*

Statements	Reasons
1. *EFGH* is a quadrilateral, $\angle HEF$ and $\angle FGH$ are right angles, and $\overline{EG}$ bisects $\angle HEF$ and $\angle FGH$.	**1.** Given
2. $m\angle HEG = \frac{1}{2}(90°)$, $m\angle FEG = \frac{1}{2}(90°)$, $m\angle HGE = \frac{1}{2}(90°)$, and $m\angle FGE = \frac{1}{2}(90°)$	**2.** Definition of an angle bisector
3. $m\angle HEG = 45°$, $m\angle FEG = 45°$,	**3.** Multiplication

Statements	Reasons
$m\angle HGE = 45°$, and $m\angle FGE = 45°$	
4. $m\angle HEG + m\angle HGE + m\angle H = 180°$ and $m\angle FEG + m\angle FGE + m\angle F = 180°$	**4.** Angle Add. Post.
5. $45° + 45° + m\angle H = 180°$, $45° + 45° + m\angle F = 180°$	**5.** Substitution
6. $m\angle H = 90°$ and $m\angle F = 90°$	**6.** Subtraction
7. $\triangle HEG$ and $\triangle FEG$ are right isosceles triangles.	**7.** The triangle is a right triangle with cong. base angles.
8. $\overline{HE} \cong \overline{GF}$ and $\overline{HG} \cong \overline{EF}$	**8.** Definition of a quadrilateral with 4 right angles
9. $\overline{HE} \cong \overline{HG}$ and $\overline{GF} \cong \overline{EF}$	**9.** The legs of an isosceles triangle are congruent.
10. $\overline{HE} \cong \overline{GF} \cong \overline{HG} \cong \overline{EF}$	**10.** Substitution
11. $EFGH$ is a square.	**11.** Def. of a square (all right angles and all sides congruent)

10. *Sample answer:*

Given: $\overline{IJ} \cong \overline{KL}$ and $\angle IJK \cong \angle JKL$. Use the Reflexive Property to show $\overline{JK} \cong \overline{JK}$. By the SAS Congruence Postulate, show $\triangle IJK \cong \triangle LKJ$. Because $\triangle IJK \cong \triangle LKJ$, show $\overline{JL} \cong \overline{KI}$ and $\angle 1 \cong \angle 2$ by corresponding parts. By the Base Angles Converse Theorem (from $\triangle JMK$) $\overline{JM} \cong \overline{KM}$. Using the Segment Addition Postulate, $JM + ML = JL$ and $KM + MI = KI$. $\overline{JL} \cong \overline{KI}$ and $\overline{JM} \cong \overline{KM}$. Use the property of equality and substitution to state $\overline{ML} \cong \overline{MI}$. Now $\angle 5 \cong \angle 6$ by the Base Angles Theorem (of $\triangle MIL$). $\angle 3 \cong \angle 4$ by the Vertical Angles Congruence Theorem. $\angle 1$, $\angle 2$, and $\angle 3$ make up $\triangle JMK$ and $\angle 4$, $\angle 5$, and $\angle 6$ make up $\triangle MIL$. So, $m\angle 1 + m\angle 2 + m\angle 3 = 180°$ and $m\angle 4 + m\angle 5 + m\angle 6 = 180°$ by the Angle Addition Postulate. Using substitution, $m\angle 2 + m\angle 2 + m\angle 3 = m\angle 3 + m\angle 5 + m\angle 5$, $2m\angle 2 = 2m\angle 5$, $m\angle 2 = m\angle 5$ (using subtraction, addition, and division properties of equality). Since $\angle 2 \cong \angle 5$, use the Alternative Interior Angles Converse to prove $\overline{JK} \parallel \overline{LI}$.

11. *Sample answer:*
Use the same process and result from the previous exercise (10) to determine $\overline{OP} \parallel \overline{QR}$ and $\overline{OR} \parallel \overline{PQ}$. Because there are two sets of opposite lines that are parallel, $OPQR$ is a parallelogram. Because $OPQR$ is a parallelogram, $\overline{OP} \cong \overline{QR}$ and $\overline{OR} \cong \overline{PQ}$. $\overline{PQ} \cong \overline{QR}$ because $MNPQR$ is a regular pentagon (all sides of a regular pentagon are congruent). Using substitution, $\overline{OR} \cong \overline{QR}$ and $\overline{OP} \cong \overline{PQ}$. Now, $\overline{OP} \cong \overline{PQ} \cong \overline{QR} \cong \overline{RO}$, which means $OPQR$ is a rhombus (all sides are congruent).