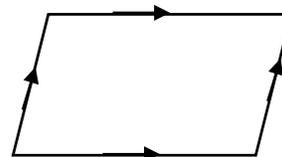


**PARALLELOGRAM****Properties of a parallelogram:**

*If a quadrilateral is a parallelogram, then*

1. both pairs of opposite sides are parallel
2. both pairs of opposite sides are congruent
3. its diagonals bisect each other
4. both pairs of opposite angles are congruent
5. its consecutive angles are supplementary angles

Sketch an example of a parallelogram.

**Ways to prove a quadrilateral is a parallelogram:**

*A quadrilateral is a parallelogram if*

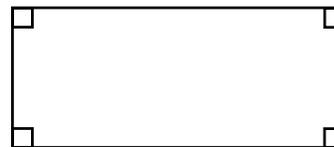
1. both pairs of opposite sides are parallel
  2. both pairs of opposite sides are congruent
  3. its diagonals bisect each other
  4. both pairs of opposite angles are congruent
  5. one angle is supplementary to both consecutive angles
  6. one pair of opposite sides both parallel and congruent
- 

**RECTANGLE****Properties of a rectangle:**

*If a parallelogram is a rectangle, it has all the properties of a parallelogram and*

1. four right angles
2. congruent diagonals

Sketch an example of a rectangle.

**Ways to prove a parallelogram is a rectangle:**

*A parallelogram is a rectangle if*

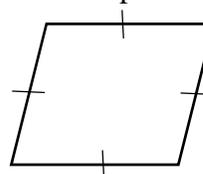
1. it has four right angles
  2. it has congruent diagonals
- 

**RHOMBUS****Properties of a rhombus:**

*If a parallelogram is a rhombus, it has all the properties of a parallelogram and*

1. it has four congruent sides
2. its diagonals are perpendicular and bisect the opposite angles of the rhombus

Sketch an example of a rhombus.



## Ways to prove a parallelogram is a rhombus:

A parallelogram is a rhombus if

1. it has four congruent sides
  2. its diagonals are perpendicular
- 

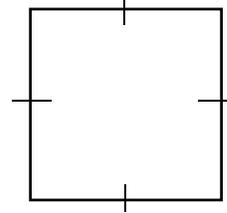
## SQUARE

### Properties of a square:

If a parallelogram is a square, it has all the properties of a parallelogram and

1. it has four right angles and four congruent sides
2. its diagonals are congruent and perpendicular

Sketch an example of a square.



### Ways to prove a parallelogram is a square:

A parallelogram is a square if

1. it has four right angles and four congruent sides
  2. its diagonals are congruent and perpendicular
- 

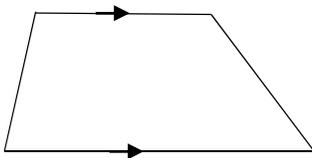
## TRAPEZOID

### Properties of a trapezoid:

If a quadrilateral is a trapezoid, it has at least one pair of parallel sides.

A trapezoid is isosceles if it has one pair of congruent sides.

Sketch an example of a trapezoid and an isosceles trapezoid:



Trapezoid



Isosceles trapezoid

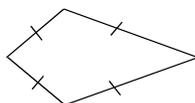
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## KITE

### Properties of a kite:

If a quadrilateral is a kite, it has 2 pairs of congruent consecutive sides.

Sketch an example of a kite:



# Answer Key

## Chapter 6

### Lesson 6.2

### Practice C

- No; consecutive  $\sphericalangle$ s are not supplementary.
- No; opposite  $\sphericalangle$ s are not  $\cong$ .    3. yes    4. 3
- 5    6. 4    7. 8    8. 5    9. 12    10.  $37^\circ$
- $90^\circ$     12.  $53^\circ$     13.  $53^\circ$     14. 20
- $MP = 8\sqrt{2}, NO = 8\sqrt{2} \Rightarrow \overline{MP} \cong \overline{NO}$
- $MN = 4, PO = 4 \Rightarrow \overline{MN} \cong \overline{PO}$
- slope  $\overline{MP} = \text{slope } \overline{NO} = 1$
- yes; parallel lines have equal slope.
- yes;  $MQ = 4\sqrt{2}, QO = 4\sqrt{2}, \overline{MQ} \cong \overline{QO}$   
 $NQ = 2\sqrt{13}, QP = 2\sqrt{13}, \overline{NQ} \cong \overline{QP}$
- 20.

Statements	Reasons
1. $\square MATH$	1. Given
2. $\overline{MN} \cong \overline{AT}$	2. Given
3. $\overline{AT} \cong \overline{MH}$ ,	3. Opposite sides of $\square$ are $\cong$ .
4. $\overline{MN} \cong \overline{MH}$	4. Transitive Property of $\cong$
5. $\angle 1 \cong \angle 2$	5. $\sphericalangle$ s opposite $\cong$ sides are $\cong$ .

21.

Statements	Reasons
1. $\square ATRO$	1. Given
2. $\overline{PT} \cong \overline{IP}$	2. Given
3. $\angle I \cong \angle T$	3. $\sphericalangle$ s opposite $\cong$ sides are $\cong$ .
4. $\angle T \cong \angle AOR$	4. Opposite $\sphericalangle$ s of a $\square$ are $\cong$ .
5. $\angle I \cong \angle AOR$	5. Transitive Property of $\cong$

# Answer Key

## Chapter 6

### Lesson 6.3

### Practice C

1. yes 2. yes 3. no 4. no 5. no

6. yes 7. yes 8. yes

9. slope of  $\overline{AB} = \text{slope } \overline{CD} = -1$  and slope  $\overline{BC} = \text{slope } \overline{DA} = 5$ , so  $ABCD$  is  $\square$  by definition

10.  $AB = CD = \sqrt{17}$  and  $BC = DA = \sqrt{45}$  so  $ABCD$  is a  $\square$  since both pair of opposite sides are  $\cong$ . 11.  $(8, 6), (0, -8), (-8, 10)$

12.  $(6, -1), (0, -7), (-4, 5)$

13.

Statements	Reasons
1. Regular hexagon $JKLMNO$	1. Given
2. $\overline{JO} \cong \overline{NM}$ , $\overline{JK} \cong \overline{ML}$ , $\angle J \cong \angle M$	2. Definition of regular polygon
3. $\triangle OJK \cong \triangle NML$	3. SAS Congruence Postulate
4. $\overline{OK} \cong \overline{NL}$	4. Corresp. parts of $\cong \triangle$ 's are $\cong$ .
5. $\overline{ON} \cong \overline{KL}$	5. Definition of regular polygon
6. $OKLN$ is a $\square$	6. If both pairs of opp. sides are $\cong$ , then quad. is a $\square$ .

14.

Statements	Reasons
1. $VWKJ$ and $SJRU$ are $\square$ .	1. Given
2. $\angle W \cong \angle J$ , $\angle J \cong \angle U$	2. Opp. $\sphericalangle$ of a $\square$ are $\cong$ .
3. $\angle W \cong \angle U$	3. Transitive Prop. of $\cong$

15. Since  $ABCD$  is a  $\square$ , opposite sides are  $\parallel$ . So  $\overline{AD} \parallel \overline{BC}$  and segments contained within  $\parallel$  segments are also  $\parallel$  so  $\overline{AE} \parallel \overline{BF}$ . We know opposite sides of  $\square$  are  $\cong$  so  $\overline{AD} \cong \overline{BC}$ . Since  $E$  and  $F$  are given as midpoints we can show  $\overline{AE} \cong \overline{ED}$  and  $\overline{CF} \cong \overline{FB}$ , so through Segment Addition Postulate and Division Property of Equality we can show  $\overline{AE} \cong \overline{FB}$ . So quad.  $ABFE$  is a  $\square$  since one pair of opposite sides is  $\parallel$  and  $\cong$ .

# Answer Key

## Chapter 6

### Lesson 6.4

#### Practice C

1.  $27^\circ$  2.  $54^\circ$  3.  $126^\circ$  4.  $54^\circ$  5.  $126^\circ$   
 6.  $90^\circ$  7.  $90^\circ$  8.  $63^\circ$  9. true; false  
 10. false; true 11. true; false 12. false; false  
 13. true; true; a rhombus is a square if and only if it is a rectangle. 14. 11 15.  $60^\circ$  16. 10

17.

Statements	Reasons
1. WHAT is a $\square$ .	1. Given
2. $\overline{WD} \cong \overline{DA}$	2. Diagonals of $\square$ bisect each other.
3. $\overline{HD} \cong \overline{DT}$	3. Diagonals of $\square$ bisect each other.
4. DART is a rhombus.	4. Given
5. $\overline{DT} \cong \overline{DA}$	5. Definition of rhombus
6. $\overline{WD} \cong \overline{HD} \cong \overline{DA} \cong \overline{DT}$	6. Substitution
7. $WA = WD + DA$ $HT = HD + DT$	7. Seg. Add. Postulate
8. $WA = HT$	8. Substitution
9. WHAT is a rectangle	9. If diagonals of $\square$ are $\cong$ , then it is a rectangle.

18.

Statements	Reasons
1. $\triangle GEC \cong \triangle GHX$	1. Given
2. $\overline{GE} \cong \overline{GH}$	2. Corresp. parts of $\cong$ $\triangle$ 's are $\cong$ .
3. GEBH is a $\square$	3. Given
4. $\overline{GH} \cong \overline{EB}$	4. If quad. is a $\square$ , then opp. sides are $\cong$ .
5. $\overline{GE} \cong \overline{HB}$	5. If quad. is a $\square$ , then opp. sides are $\cong$ .
6. $\overline{GE} \cong \overline{EB}$	6. Substitution
7. $\overline{EB} \cong \overline{HB}$	7. Substitution
8. GEBH is a rhombus.	8. A $\square$ with 4 $\cong$ sides is a rhombus.

19.

Statements	Reasons
1. JXPE is a $\square$ .	1. Given
2. $\overline{EJ} \cong \overline{PX}$ , $\overline{EP} \cong \overline{JX}$	2. Opp. sides of $\square$ are $\cong$ .
3. $\overline{EX} \cong \overline{EX}$	3. Reflex. Prop. of $\cong$
4. $\triangle JXE \cong \triangle PEX$	4. SSS Congr. Postulate
5. $\angle J \cong \angle XPE$	5. Corresp. parts of $\cong$ $\triangle$ 's are $\cong$ .
6. $\overline{XP} \perp \overline{EN}$	6. Given
7. $\angle XPE$ is a rt. $\angle$ .	7. Definition of $\perp$
8. $\angle J$ is a rt. $\angle$ .	8. Substitution
9. JANE is a $\square$ .	9. Given
10. $\angle J$ and $\angle A$ are supplementary.	10. Adj. $\sphericalangle$ s of $\square$ are supplementary.
11. $\angle A$ is a rt. $\angle$ .	11. If 2 $\sphericalangle$ s are suppl. and one is a rt. $\angle$ , then the other is a rt. $\angle$ .
12. $\angle N$ and $\angle PEJ$ are rt. $\sphericalangle$ s.	12. Opp. $\sphericalangle$ s of a $\square$ are $\cong$ .
13. JANE is a rectangle.	13. A $\square$ with 4 rt. $\sphericalangle$ s is a rectangle.

# Answer Key

## Chapter 6

### Lesson 6.5

### Practice C

1. yes, no   2. no   3. yes, yes
4.  $107^\circ$    5.  $129^\circ$    6.  $68^\circ$    7. 20.5   8. 20
9. 7   10.  $WE = SE \approx 7.62$ ;  $WT = ST \approx 10.44$
11.  $m\angle E = m\angle T = 118^\circ$    12.  $m\angle T = 113^\circ$ ,  
 $m\angle W = 97^\circ$    13.  $60^\circ, 60^\circ, 120^\circ, 120^\circ$
14. The sum of the lengths of the two bases is 12.
- 15.

Statements	Reasons
1. $LORI$ is a rectangle.	1. Given
2. $\angle ILB$ and $\angle ROB$ are rt. $\sphericalangle$ s.	2. Def. of rectangle
3. $\angle ILB \cong \angle ROD$	3. All right $\sphericalangle$ s are $\cong$ .
4. $\overline{LI} \cong \overline{OR}$	4. Opp. sides of $\square$ are $\cong$ .
5. $\overline{LB} \cong \overline{DO}$	5. Given
6. $\triangle LBI \cong \triangle ODR$	6. SAS Congruence Postulate
7. $\overline{BI} \cong \overline{DR}$	7. Corresp. parts of $\cong$ $\triangle$ 's are $\cong$ .
8. $\overline{BD} \parallel \overline{IR}$	8. Def. of $\square$
9. $BIRD$ is an isos. trap.	9. Def. of isos. trap.

16.

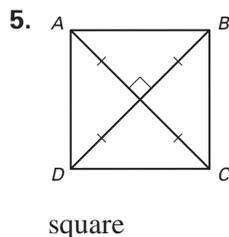
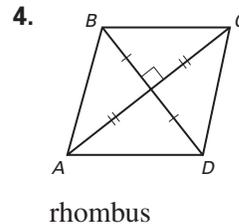
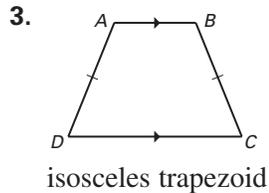
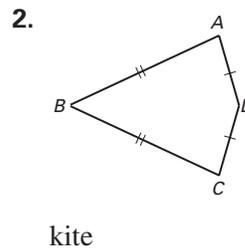
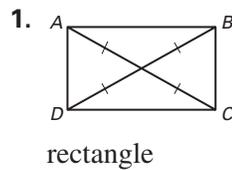
Statements	Reasons
1. $\overline{AF} \not\cong \overline{BC}$	1. Given
2. $\triangle ABC \cong \triangle CDA$	2. Given
3. $\angle CAB \cong \angle ACD$	3. Corresp. parts of $\cong$ $\triangle$ 's are $\cong$ .
4. $\overline{CF} \parallel \overline{AB}$	4. Alternate Interior $\sphericalangle$ s Thm. Converse
5. $ABCF$ is a trapezoid.	5. Def. of trapezoid

# Answer Key

## Chapter 6

### Lesson 6.6

#### Practice C



6. sometimes  
7. always 8. always  
9. never 10. sometimes  
11. never 12. sometimes

13–15. Answers vary; *Sample answers:*

13.  $\overline{AC} \cong \overline{BD}$ ; with  $\cong$  diagonals is a rectangle.

14.  $\overline{AB} \cong \overline{AD}$ ; quad. with two pairs of consec.  $\cong$  sides, but opposite sides  $\not\cong$  is a kite.

15.  $\overline{AD} \cong \overline{BC}$ ; trap. with nonparallel sides  $\cong$  is isosceles. 16. parallelogram; slope  $\overline{PQ} =$  slope  $\overline{RS} = -\frac{1}{5}$ ; slope  $\overline{QR} =$  slope  $\overline{PS} = 1$ ; adjacent sides  $\not\cong$  ( $\sqrt{18} \neq \sqrt{26}$ ) 17. rectangle; slope  $\overline{PQ} =$  slope  $\overline{RS} = -\frac{1}{4}$ ; slope  $\overline{QR} =$  slope  $\overline{PS} = 4$ ; adjacent sides  $\perp$  and not  $\cong$  ( $\sqrt{17} \neq \sqrt{68}$ )

18. trapezoid; slope  $\overline{PQ} =$  slope  $\overline{RS} =$  undefined; slope  $\overline{SP} \neq$  slope  $\overline{RQ}$  ( $1 \neq -2$ ) 19.  $(-5, 5.5)$ ,  $(-8, 2)$ ,  $(-7, -2.5)$ ,  $(-4, 1)$ ; parallelogram