Name ______________________________ Date ________________

Quilting and Tessellations
Introduction to Quadrilaterals

Vocabulary

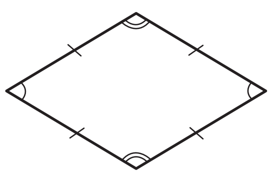
Write the term that best completes each statement.

1. A quadrilateral with all congruent sides and all right angles is called a(n) ____________.
2. A(n) ____________ is a parallelogram whose four sides have the same length.
3. A(n) ____________ uses circles to show how elements among sets of numbers or objects are related.
4. A polygon that has four sides is a(n) ____________.
5. A quadrilateral with two pairs of parallel sides is called a(n) ____________.
6. A(n) ____________ of a plane is a collection of polygons that are arranged so that they cover the plane with no gaps.
7. A(n) ____________ is a quadrilateral with exactly one pair of parallel sides.
8. A parallelogram with four right angles is a(n) ____________ .
9. A(n) ____________ is a four-sided figure with two pairs of adjacent sides of equal length, with opposite sides not equal in length.

Problem Set

Identify all of the terms from the following list that apply to each figure: quadrilateral, parallelogram, rectangle, square, trapezoid, rhombus, kite.

1.

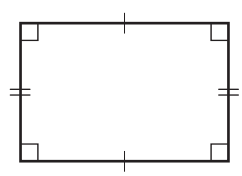


rhombus

parallelogram

quadrilateral

2.



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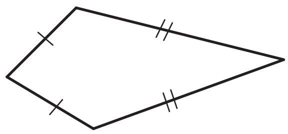

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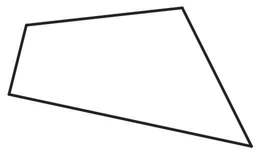

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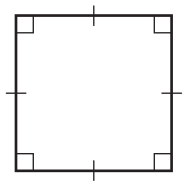
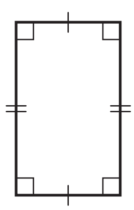


6.

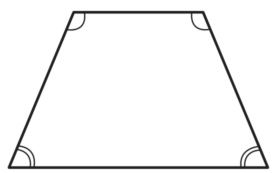
Name the type of quadrilateral that best describes each figure. Explain your answer.

7.



Rectangle. The quadrilateral has two pairs of parallel sides and four right angles, but the four sides are not all congruent.

8.



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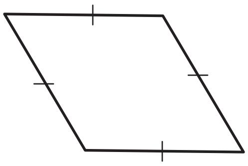
9.



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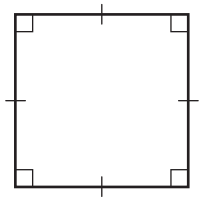

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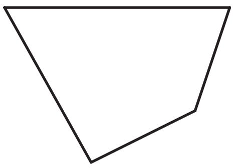

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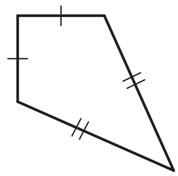
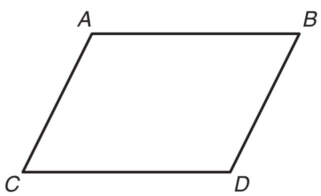


List all possible names for each quadrilateral based on its vertices.

13.



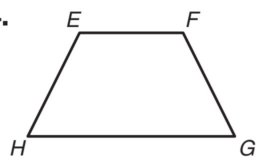
ABDC ***ACDB***

BDCA ***BACD***

DCAB ***DBAC***

CABD ***CDBA***

14.



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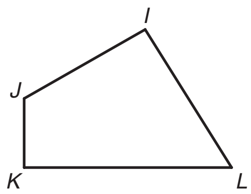
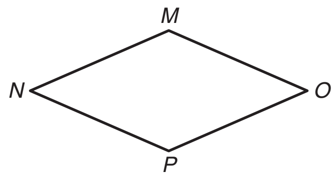
15.

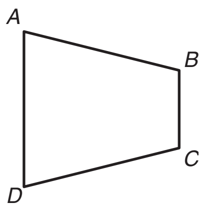


16.



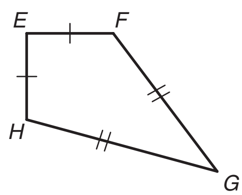
Name the indicated parts of each quadrilateral.

17. Name the parallel sides.

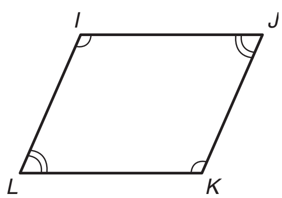


AD* and *BC

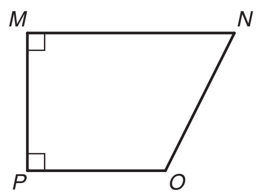
18. Name the congruent sides.



19. Name the congruent angles.



20. Name the right angles.



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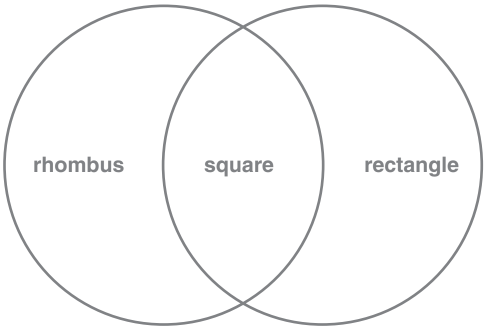
Draw a Venn diagram for each description.

21. Suppose that a part of a Venn diagram has two circles. One circle represents all types of quadrilaterals with four congruent sides. The other circle represents all types of quadrilaterals with four congruent angles. Draw this part of the Venn diagram and label it with the appropriate types of quadrilaterals.



22. Suppose that a part of a Venn diagram has two circles. One circle represents all types of quadrilaterals with two pairs of congruent sides (adjacent or opposite). The other circle represents all types of quadrilaterals with at least one pair of parallel sides. Draw this part of the Venn diagram and label it with the appropriate types of quadrilaterals.

6

23. Suppose that a part of a Venn diagram has two circles. One circle represents all types of quadrilaterals with two pairs of parallel sides. The other circle represents all types of quadrilaterals with four congruent sides. Draw this part of the Venn diagram and label it with the appropriate types of quadrilaterals.

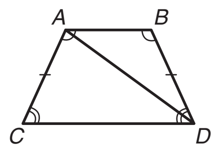
24. Suppose that a part of a Venn diagram has two circles. One circle represents all types of quadrilaterals with four right angles. The other circle represents all types of quadrilaterals with two pairs of parallel sides. Draw this part of the Venn diagram and label it with the appropriate types of quadrilaterals.

Name ______________________________ Date ______________

When Trapezoids Are Kites
Kites and Trapezoids

Vocabulary

Identify all instances of each term in the figure.



1. isosceles trapezoid

2. base of a trapezoid

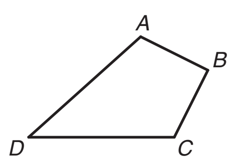
3. base angles of a trapezoid

4. diagonal

Problem Set

Use the given figure to answer each question.

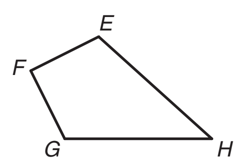
1. The figure shown is a kite with $\angle DAB \cong \angle DCB$. Which of the kite's sides are congruent?



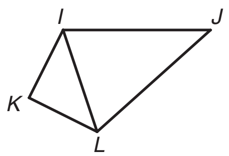
_AB_ and _CB_ are congruent.

_AD_ and _CD_ are congruent.

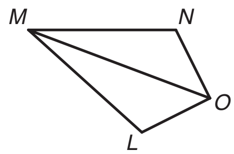
2. The figure shown is a kite with $\overline{FG} \cong \overline{FE}$. Which of the kite's angles are congruent?



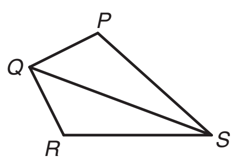
3. Given that *IJLK* is a kite, what kinds of triangles are formed by diagonal $\overline{IL}$?



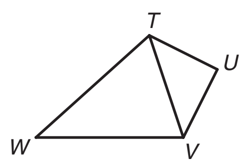
4. Given that *LMNO* is a kite, what is the relationship between the triangles formed by diagonal $\overline{MO}$?



5. Given that *PQRS* is a kite, which angles are congruent?



6. Given that *TUVW* is a kite, which angles are congruent?



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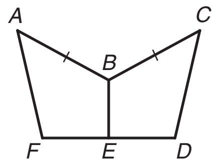
Write a paragraph proof to prove each statement.

7. Given that *ABEF* and *BCDE* are both kites, prove that $\angle FAB \cong \angle DCB$.



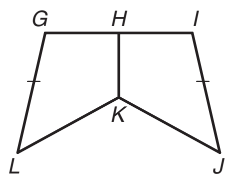
You are given that *ABEF* and *BCDE* are both kites. This fact means that each has two pairs of adjacent sides that are congruent. By visual inspection, $\overline{AB} \cong \overline{AF}$, $\overline{BE} \cong \overline{FE}$, $\overline{BC} \cong \overline{DC}$, and $\overline{BE} \cong \overline{DE}$. By the Transitive Property of Congruence, $\overline{FE} \cong \overline{BE} \cong \overline{DE}$.

You are also given that $\overline{AB} \cong \overline{CB}$. By the Transitive Property of Congruence, $\overline{AF} \cong \overline{AB} \cong \overline{CB} \cong \overline{CD}$.

Because each pair of corresponding sides is congruent, *ABEF* and *CBED* are congruent.

By the definition of congruence, corresponding angles *FAB* and *DCB* are congruent. So, $\angle FAB \cong \angle DCB$.

8. Given that *GHKL* and *IHKJ* are both kites, prove that $\angle LGH \cong \angle JIH$.



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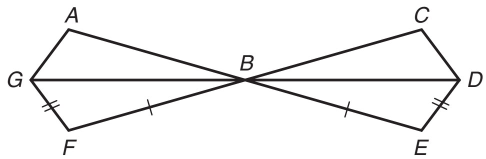
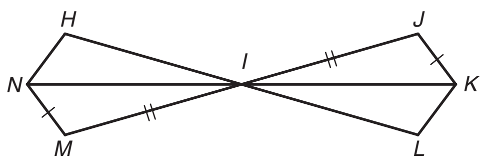
9. Given that *ABFG* and *CBED* are both kites, prove that $\Delta ABG \cong \Delta EBD$.



10. Given that *HIMN* and *JILK* are both kites, prove that $\Delta NHI \cong \Delta KJI$.

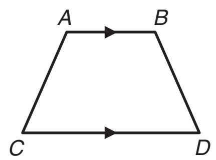


6

Name ______________________ Date ____________

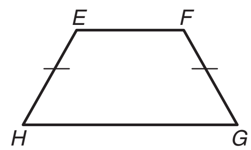
Use the given figure to answer each question.

11. The figure shown is an isosceles trapezoid with $\overline{AB} \parallel \overline{CD}$. Which sides are congruent?

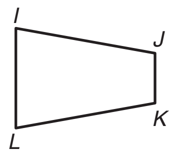


***AC* and *BD* are congruent.**

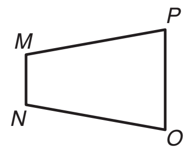
12. The figure shown is an isosceles trapezoid with $\overline{EH} \cong \overline{FG}$. Which sides are parallel?



13. The figure shown is an isosceles trapezoid with $\overline{IJ} \cong \overline{KL}$. Given that *IJKL* is an isosceles trapezoid, what are the bases?



14. The figure shown is an isosceles trapezoid with $\overline{MP} \cong \overline{NO}$. Given that *MPON* is an isosceles trapezoid, what are the pairs of base angles?



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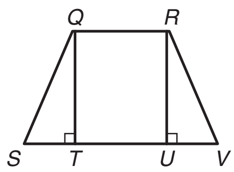
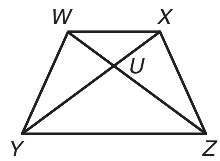
15. Given that *QRVS* is an isosceles trapezoid, which angles are congruent?

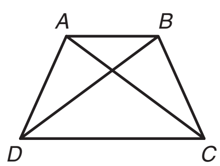


16. Given that *WXZY* is an isosceles trapezoid, which angles are congruent?



Write a paragraph proof to prove each statement.

17. Given that *ABCD* is an isosceles trapezoid, prove that $\Delta ACD \cong \Delta BDC$.



You are given that *ABCD* is an isosceles trapezoid. This fact means that $\overline{AD} \cong \overline{BC}$, and $\angle ADC$ and $\angle BCD$ are congruent.

Also, by the Reflexive Property of Congruence, $\overline{DC} \cong \overline{CD}$.

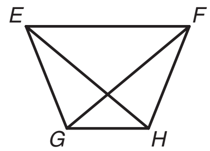
By the SAS Congruence Theorem, $\Delta CDA \cong \Delta DCB$.

$\angle ACD$ and $\angle BDC$ are corresponding angles. By the definition of congruent figures, $\angle ACD \cong \angle DBC$.

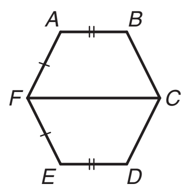
Because all three pairs of corresponding sides are congruent, $\Delta ACD \cong \Delta BDC$.

Name ________________________________ Date ________________

18. Given that *EFHG* is an isosceles trapezoid, prove that $\angle GEH \cong \angle HFG$.



19. Given that *ABCF* and *FEDC* are isosceles trapezoids, prove that $\angle AFC \cong \angle EFC$.



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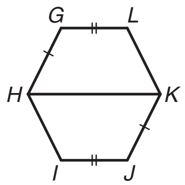
20. Given that *GHKL* and *JKHI* are isosceles trapezoids, prove that $\angle G \cong \angle J$.



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Name ______________________ Date ____________

Binocular Stand Design
Parallelograms and Rhombi

Vocabulary

Match each definition to its corresponding term.

1. two angles of a polygon that do not share a common side

2. two angles of a polygon that share a common side

3. two sides of a polygon that do not intersect

4. two sides of a polygon that share a common vertex

a. opposite sides

b. consecutive sides

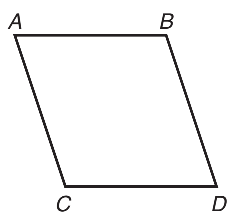
c. consecutive angles

d. opposite angles

Problem Set

Identify the indicated parts of the given parallelogram.

1. Name the pairs of consecutive sides of the parallelogram.



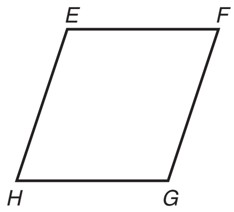
AB* and *BD

BD* and *DC

DC* and *CA

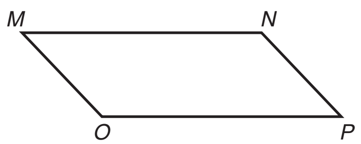
CA* and *AB

2. Name the pairs of opposite sides of the parallelogram.



3. Name the pairs of opposite angles of the parallelogram.

4. Name the pairs of consecutive angles of the parallelogram.



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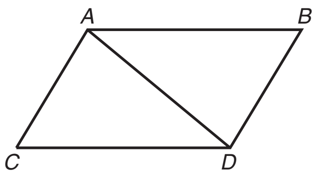
Name ______________________ Date ____________

Write a paragraph proof to prove each statement.

5. Given that $\overline{AB} \parallel \overline{CD}$ and $\overline{AC} \parallel \overline{BD}$, use the ASA Congruence Theorem to prove that $\angle B \cong \angle C$.



Sides *AB* and *CD* are parallel segments that are cut by a transversal. By the Alternate Internal Angles Theorem, corresponding angles *CDA* and *BAD* are congruent.

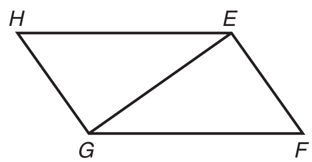
Sides *AC* and *BD* are parallel segments that are cut by a transversal. By the Alternate Internal Angles Theorem, corresponding angles *CAD* and *BDA* are congruent.

By the Reflexive Property of Equality, $\overline{AD} \cong \overline{DA}$.

Because corresponding angles *CAD* and *BDA* are congruent and corresponding angles *CDA* and *BAD* are congruent (and the included sides are congruent), by the ASA Congruence Theorem, $\Delta ACD \cong \Delta DBA$.

By the definition of congruence, corresponding angles *B* and *C* are congruent. So, $\angle B \cong \angle C$.

6. Given that $\overline{HG} \parallel \overline{EF}$ and $\overline{HG} \parallel \overline{GF}$, use the ASA Congruence Theorem to prove that $\overline{HG} \cong \overline{EF}$.



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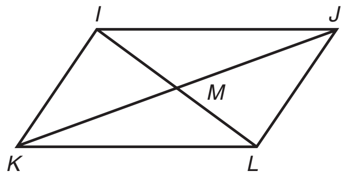
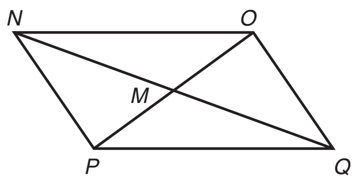
7. Given that $\overline{IK} \parallel \overline{LJ}$ and $\overline{IK} \cong \overline{LJ}$, use the AAS Congruence Theorem to prove that $\Delta IMK \cong \Delta LMJ$.



8. Given that $NO \parallel QP$ and $\overline{NO} \cong \overline{QP}$, use the AAS Congruence Theorem to prove that $\Delta NOM \cong \Delta QPM$.



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Name ______________________ Date ______________

Use what you know about rhombi to answer each question.

9. What is the relationship between consecutive angles of a rhombus?

Consecutive angles of a rhombus are supplementary.

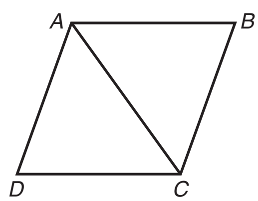
10. What is the relationship between opposite angles of a rhombus?

11. What is the relationship between consecutive sides of a rhombus?

12. Explain the difference between parallelograms and rhombi in terms of opposite and consecutive sides.

Use the given information to complete each two-column proof.

13. If $\overline{AC}$ bisects $\angle DAB$ and $\angle DCB$, then $\angle D \cong \angle B$.



Statement	Reason
1. $\overline{AC}$ **bisects** $\angle DAB$ **and** $\angle DCB$**.**	**1.** Given
2. $\angle DAC \cong \angle BAC$	**2.** Definition of **angle bisector**
3. $\angle DCA \cong \angle BCA$	**3.** Definition of **angle bisector**
4. $\overline{AC} \cong \overline{AC}$	**4.** Reflexive Property of Congruence
5. $\Delta ADC \cong \Delta ABC$	**5.** **ASA Congruence Theorem**
6. $\angle D \cong \angle B$	**6.** Definition of congruence

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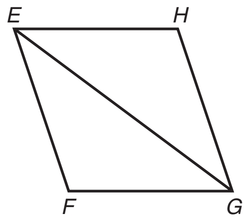
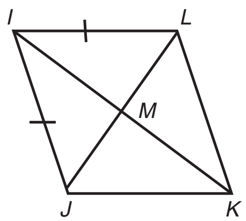
14. If $\overline{EG}$ bisects $\angle FEH$ and $\angle FGH$, then $\overline{EF} \cong \overline{EH}$.



Statement	Reason
1. $\overline{EG}$ bisects $\angle FEH$ and $\angle FGH$.	**1.** ___________
2. $\angle FEG \cong$	**2.** Definition of angle bisector
3. $\angle FGE \cong$	**3.** Definition of angle bisector
4. $\overline{EG} \cong \overline{EG}$	**4.** ________________________________
5. $\Delta FEG \cong$	**5.** ASA Congruence Theorem
6. $\overline{EF} \cong \overline{EH}$	**6.** Definition of ____________

15. If $\overline{IK}$ bisects $\angle JIL$ and $\overline{IL} \cong \overline{IJ}$, then $\angle IMJ \cong \angle IML$.



Statement	Reason
1.	**1.** Given
2. $\angle LIM \cong$	**2.** Definition of angle bisector
3. $\overline{IM} \cong \overline{IM}$	**3.** ________________________________
4.	**4.** Given
5. $\Delta JIM \cong \Delta LIM$	**5.** ___________________________
6. $\angle IMJ \cong \angle IML$	**6.** Definition of _____________

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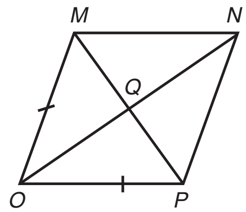
16. If $\overline{ON}$ bisects $\angle MOP$ and $\overline{MO} \cong \overline{PO}$, then $\overline{MQ} \cong \overline{PQ}$.



Statement	Reason
1. $\overline{ON}$ bisects $\angle MOP$.	**1.** ________
2. $\cong \angle POQ$	**2.** Definition of angle bisector
3. $\overline{OQ} \cong \overline{OQ}$	**3.** ______________________________
4.	**4.** Given
5. $\Delta MOQ \cong \Delta POQ$	**5.** ______________________________
6.	**6.** Definition of congruence

6

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Name ____________________ Date ____________

Positive Reinforcement
Rectangles and Squares

Vocabulary

Identify similarities and differences between the terms.

1. square and rectangle

Problem Set

Explain why each statement is true.

1. A rectangle is always a parallelogram.

   A rectangle must have two pairs of parallel sides, so a rectangle is always a parallelogram.

2. A parallelogram is sometimes a rectangle.

3. A rectangle is sometimes a square.

4. A square is always a rectangle.

5. The diagonals of a square are perpendicular.

6. The diagonals of a rectangle are sometimes perpendicular.

7. A rectangle is sometimes a rhombus.

8. A square is always a rhombus.

9. A rhombus is sometimes a rectangle.

10. A rhombus is sometimes a square.

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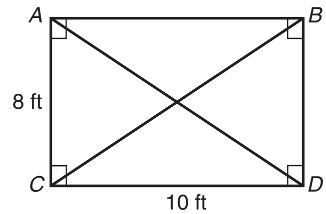
Given the lengths of the sides of a rectangle, calculate the length of each diagonal. Simplify radicals, but do not evaluate.

11. A rectangular construction scaffold with diagonal support beams is 8 feet high and 10 feet wide.

What is the length of each diagonal?



$AD^2 = AC^2 + CD^2$

$AD^2 = 8^2 + 10^2$

$AD^2 = 64 + 100$

$AD^2 = 164$

$AD = \sqrt{164} = 2\sqrt{41}$

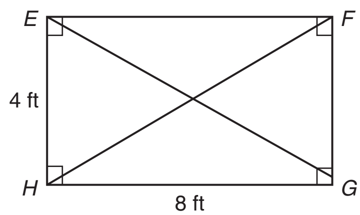
The length of diagonal *AD* is $2\sqrt{41}$ feet.

$BC = AD = 2\sqrt{41}$

The length of diagonal *BC* is $2\sqrt{41}$ feet.

12. A fence has rectangular sections that are each 4 feet tall and 8 feet long. Each section has a diagonal support beam.

What is the length of each diagonal?



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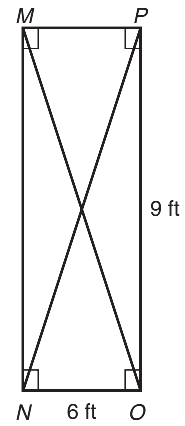
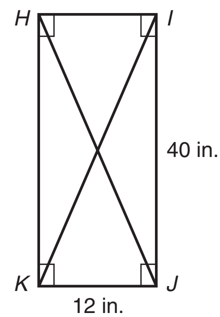
13. A community garden has a rectangular frame for sugar snap peas. The frame is 9 feet high and 6 feet wide, and it has two diagonals to strengthen it.

What is the length of each diagonal?



14. The sides of a shelving unit are metal rectangles with two diagonals for support. Each rectangle is 12 inches wide and 40 inches high.

What is the length of each diagonal?



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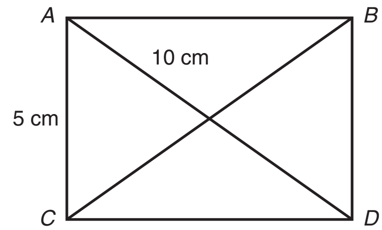
Given the length of a side of a rectangle and the length of a diagonal, calculate the length of another side. Simplify radicals, but do not evaluate.

15. Given that *ABDC* is a rectangle, find *CD*.



$AD^2 = AC^2 + CD^2$

$CD^2 = AD^2 - AC^2$

$CD^2 = 10^2 - 5^2$

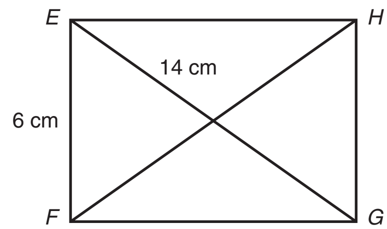
$CD^2 = 100 - 25$

$CD^2 = 75$

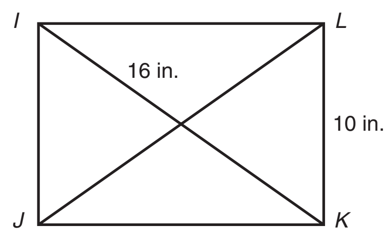
$CD = \sqrt{75} = 5\sqrt{3}$

CD is $5\sqrt{3}$ centimeters.

16. Given that *EFGH* is a rectangle, find *FG*.



17. Given that *IJKL* is a rectangle, find *IL.*



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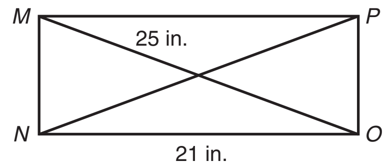
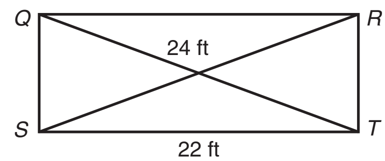
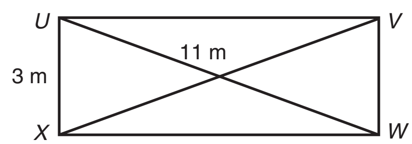
18. Given that *MNOP* is a rectangle, find *MN.*



19. Given that *QRTS* is a rectangle, find *QS.*



20. Given that *UVWX* is a rectangle, find *XW.*



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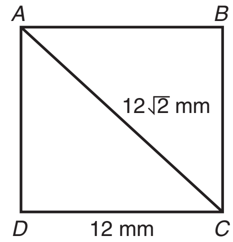
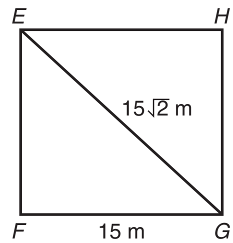
21. Given that *ABCD* is a rectangle, find *AD*.



22. Given that *EFGH* is a rectangle, find *GH.*



Determine the missing measure. Round decimals to the nearest tenth.

23. A square garden is divided into quarters by diagonal paths. If each diagonal is 50 meters long, how long is each side of the garden?

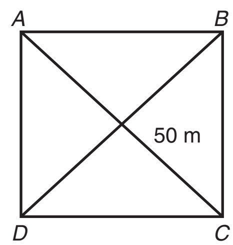
$AC^2 = AD^2 + DC^2 = 2(AD^2)$

$50^2 = 2(AD^2)$

$AD^2 = \frac{2500}{2} = 1250$

$AD = \sqrt{1250} = \sqrt{625 \cdot 2} = 25\sqrt{2} \approx 35.4$

The length of each side of the garden is approximately 35.4 meters.



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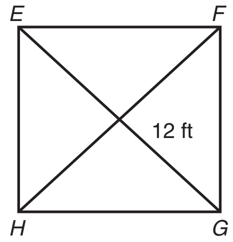
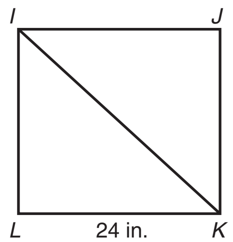
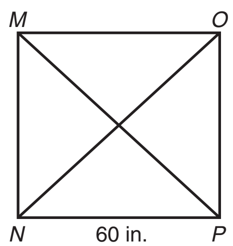
24. A square porch has diagonal support beams underneath it. If each diagonal beam is 12 feet long, what is the length of each side of the porch?



25. A heavy picture frame in the shape of a square has a diagonal support across the back. If each side of the frame is 24 inches, what is the length of the diagonal?



26. A square shelving unit has diagonal supports across the back. If each side of the frame is 60 inches, what is the length of each diagonal?



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Stained Glass
Sum of the Interior Angle Measures in a Polygon

Vocabulary

Draw a diagram to illustrate each term. Explain how your diagram illustrates the term.

1. interior angle

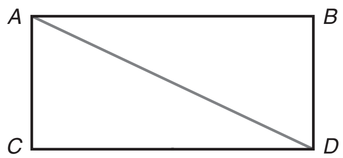
2. convex polygon

3. regular polygon

Problem Set

Calculate the sum of the interior angle measures of the polygon. Show all your work.

1. Draw all of the diagonals that connect to vertex *A*. What is the sum of the internal angles of quadrilateral *ABDC*?

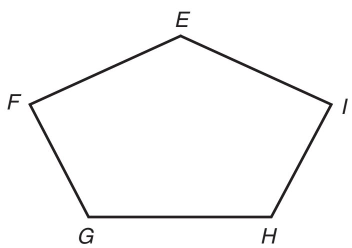


The diagonal divides the figure into two triangles. The sum of the interior angles of each triangle is 180°, so multiply 180° by 2 to find the sum of the interior angles of the quadrilateral:

$180° \times 2 = 360°$

The sum of the interior angles is 360°.

2. Draw all of the diagonals that connect to vertex *E*. What is the sum of the interior angles of polygon *EFGHI*?



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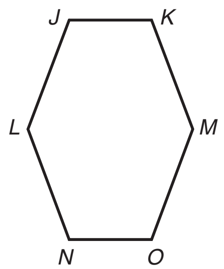
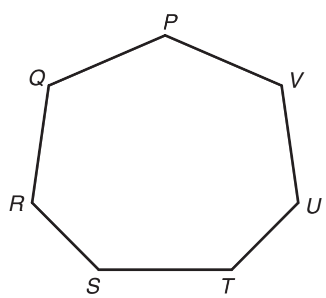
3. Draw all of the diagonals that connect to vertex *J*. What is the sum of the interior angles of polygon *JKMONL*?



4. Draw all of the diagonals that connect to vertex *P*. What is the sum of the interior angles of polygon *PQRSTUV*?



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Calculate the sum of the interior angle measures of the polygon.

5. If a convex polygon has 5 sides, what is the sum of its interior angle measures?

   The sum is equal to $(n - 2) \cdot 180°$:

   $(5 - 2) \cdot 180° = 3 \cdot 180° = 540°$

   The sum of the interior angles of the polygon is 540°.

6. If a convex polygon has 6 sides, what is the sum of its interior angle measures?

7. If a convex polygon has 8 sides, what is the sum of its interior angle measures?

8. If a convex polygon has 9 sides, what is the sum of its interior angle measures?

9. If a convex polygon has 12 sides, what is the sum of its interior angle measures?

10. If a convex polygon has 13 sides, what is the sum of its interior angle measures?

11. If a convex polygon has 16 sides, what is the sum of its interior angle measures?

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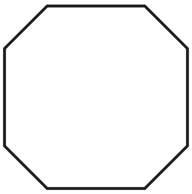
12. If a convex polygon has 17 sides, what is the sum of its interior angle measures?

Determine the measure of each interior angle of each regular polygon.

13. What is the measure of each interior angle of the regular polygon?



The sum of the interior angles is equal to $(n - 2) \cdot 180°$:

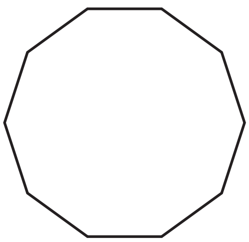
$(8 - 2) \cdot 180° = 6 \cdot 180° = 1080°$

Because the figure is a regular polygon, the measure of each interior angle can be found by dividing by *n*:

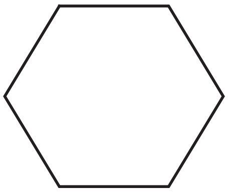
$1080° \div 8 = 135°$

The measure of each interior angle is 135°.

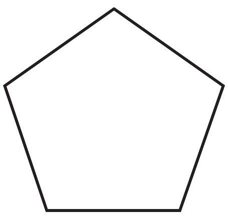
14. What is the measure of each interior angle of the regular polygon?



15. What is the measure of each interior angle of the regular polygon?



16. What is the measure of each interior angle of the regular polygon?



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Use the given information to determine the number of sides of each regular polygon.

17. The measure of each angle of a regular polygon is 108°. How many sides does the polygon have?

$n(108°) = (n - 2)(180°)$

$n(108°) = n(180°) - 2(180°)$

$n(72°) = 360°$

$360° \div 72° = 5$

The regular polygon has 5 sides. It is a pentagon.

18. The measure of each angle of a regular polygon is 120°. How many sides does the polygon have?

19. The measure of each angle of a regular polygon is 144°. How many sides does the polygon have?

20. The measure of each angle of a regular polygon is 156°. How many sides does the polygon have?

21. The measure of each angle of a regular polygon is 160°. How many sides does the polygon have?

22. The measure of each angle of a regular polygon is 162°. How many sides does the polygon have?

Name ______________________________ Date ________________

Pinwheels
Sum of the Exterior Angle Measures in a Polygon

Vocabulary

Define each term in your own words.

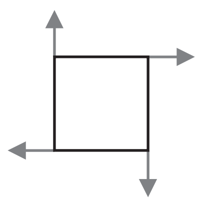
1. exterior angle

2. regular polygon

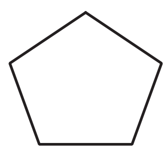
Problem Set

Extend each vertex of the polygon to create one exterior angle at each vertex.

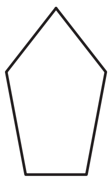
1.



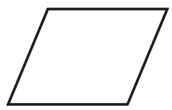
2.



3.



4.



Given the measure of an interior angle of a polygon, calculate the measure of the adjacent exterior angle. Explain how you found your answer.

5. What is the measure of an exterior angle if it is adjacent to an interior angle of a polygon that measures 90º?

   Interior and exterior angles are supplementary. So subtract 90º, the measure of the interior angle, from 180º:

   $180° - 90° = 90°$

6. What is the measure of an exterior angle if it is adjacent to an interior angle of a polygon that measures 120º?

7. What is the measure of an exterior angle if it is adjacent to an interior angle of a polygon that measures 108º?

8. What is the measure of an exterior angle if it is adjacent to an interior angle of a polygon that measures 135º?

9. What is the measure of an exterior angle if it is adjacent to an interior angle of a polygon that measures 115º?

10. What is the measure of an exterior angle if it is adjacent to an interior angle of a polygon that measures 124º?

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For each regular polygon, calculate the measure of each of its external angles. Explain how you found your answer.

11. What is the measure of each external angle of a square?

Find the sum of the internal angle measures:

$(4 - 2) \cdot 180° = 2 \cdot 180° = 360°$

Then divide 360° by 4 to find the measure of each internal angle:

$360° \div 4 = 90°$

Then subtract the measure of an internal angle from 180° to find the measure of an external angle:

$180° - 90° = 90°$

Each external angle of a square measures 90°.

12. What is the measure of each external angle of a regular pentagon?

13. What is the measure of each external angle of a regular hexagon?

14. What is the measure of each external angle of a regular octagon?

For each regular polygon, calculate the sum of the measures of its external angles. Show all your work.

15. What is the sum of the external angle measures of a regular pentagon?

Sum of the internal angle measures:

$(5 - 2) \cdot 180° = 3 \cdot 180° = 540°$

Internal angle measure $= 540° \div 5 = 108°$

External angle measure $= 180° - 108° = 72°$

Sum of the external angle measures $= 72° \cdot 5 = 360°$

The sum of the external angle measures of a regular pentagon is 360°.

16. What is the sum of the external angle measures of a regular hexagon?

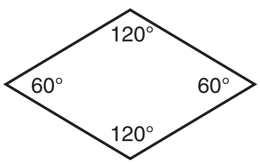
Name ______________________ Date ____________

17. What is the sum of the external angle measures of a regular octagon?

18. What is the sum of the external angle measures of a square?

For each polygon, calculate the sum of the measures of its external angles. Show all your work.

19. What is the sum of the external angle measures of the polygon?



External angle measures:

$180° - 120° = 60°$

$180° - 60° = 120°$

$180° - 120° = 60°$

$180° - 60° = 120°$

Sum of the external angle measures = $120° + 60° + 120° + 60° = 360°$

The sum of the external angle measures of the polygon is 360°.

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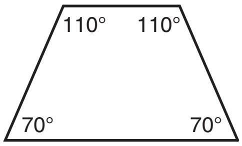
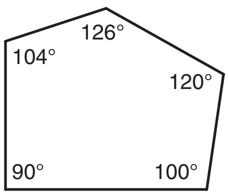
20. What is the sum of the external angle measures of the polygon?



21. What is the sum of the external angle measures of the polygon?



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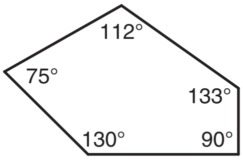
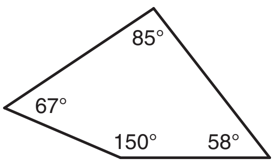
22. What is the sum of the external angle measures of the polygon?



23. What is the sum of the external angle measures of the polygon?



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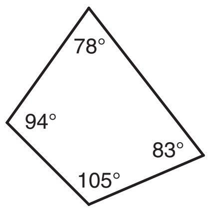
24. What is the sum of the external angle measures of the polygon?



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