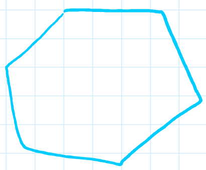
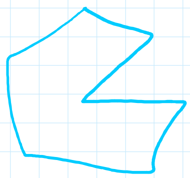
What You Will Learn

- Use the interior angle measures of polygons.
- Use the exterior angle measures of polygons.
- Use properties to find side lengths and angles of parallelograms.

Convex





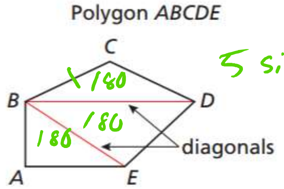
Concave

Using Interior Angle Measures of Polygons

In a polygon, two vertices that are endpoints of the same side are called *consecutive vertices*. A **diagonal** of a polygon is a segment that joins two nonconsecutive vertices.

As you can see, the diagonals from one vertex divide a polygon into triangles. Dividing a polygon with n sides into $(n - 2)$ triangles shows that the sum of the measures of the interior angles of a polygon is a multiple of 180°.

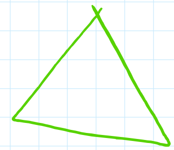
Polygon *ABCDE*

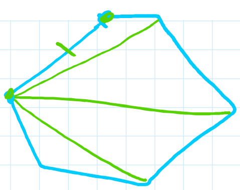


A and *B* are consecutive vertices.
Vertex *B* has two diagonals, $\overline{BD}$ and $\overline{BE}$.

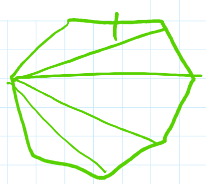
5 sides 3 △'s

180 + 180 + 180 = 540°





6 sides
4 △'s



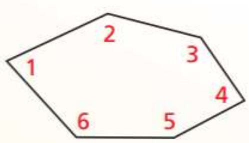
7 sides
5 △'s

Theorem 7.1 Polygon Interior Angles Theorem

The sum of the measures of the interior angles of a convex n-gon is $(n - 2) \cdot 180°$.

$$m\angle 1 + m\angle 2 + \cdots + m\angle n = \boxed{(n - 2) \cdot 180°}$$

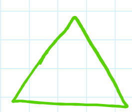
Proof Ex. 42 (for pentagons), p. 365

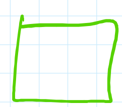


$n = 6$

$(6-2)180$
$4 \cdot 180$
$\boxed{720°}$

$(105-2) \cdot 180$
$103 \cdot 180 = 18540°$





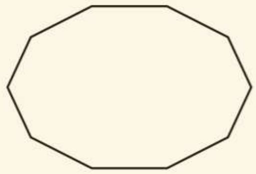
$(3-2) \cdot 180$
$1 \cdot 180$
180

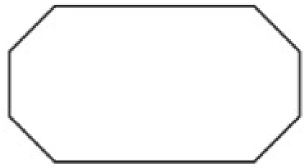
$(4-2)180$
$2 \cdot 180$
360

Corollary 7.1 Corollary to the Polygon Interior Angles Theorem

The sum of the measures of the interior angles of a quadrilateral is 360°.

Find the sum of the measures of the interior angles of the figure.





The sum of the measures of the interior angles of a convex polygon is 1800°. Classify the polygon by the number of sides.

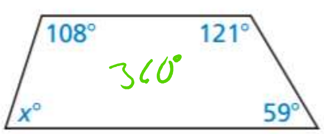
$(n-2)180 =$ sum of int ∠'s

$\frac{(n-2)\cancel{180}}{\cancel{180}} = \frac{1800}{180}$

$n-2 = 10$

$+2 \quad +2$

$\boxed{n = 12}$



$(4-2)180$

$2 \cdot 180$

$360°$

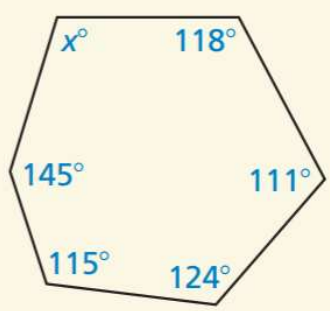
$108 + 121 + 59 + x = 360$

$108 + 180 + x = 360$

$188 + x = 360$

$-188 \quad -188$

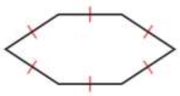
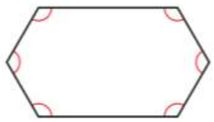
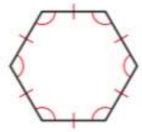
$\boxed{x = 72°}$

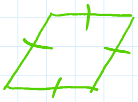
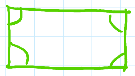
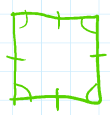


In an **equilateral polygon**, all sides are congruent.

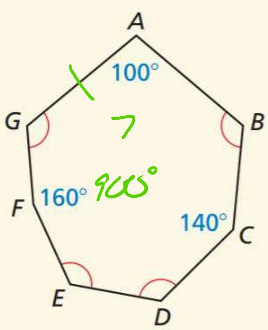
In an **equiangular polygon**, all angles in the interior of the polygon are congruent.

A **regular polygon** is a convex polygon that is both equilateral and equiangular.

A polygon is shown.



a. Is the polygon regular? Explain your reasoning.

No, not all ∠s are congruent.

b. Find the measures of ∠B, ∠D, ∠E, and ∠G.

$(n-2)180$
$(7-2)180$
900

$100 + 140 + 160 + 4x = 900$
$400 + 4x = 900$
$4x = 500$
$x = 125$

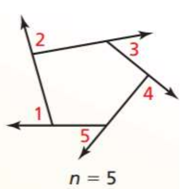
$m\angle B = 125°$
$m\angle D = 125°$
$m\angle E = 125°$
$m\angle G = 125°$

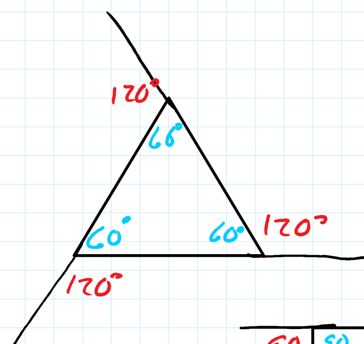
Theorem 7.2 Polygon Exterior Angles Theorem

The sum of the measures of the exterior angles of a convex polygon, one angle at each vertex, is 360°.

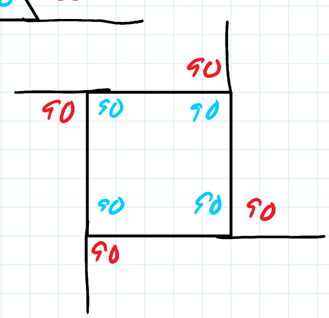
$m\angle 1 + m\angle 2 + \cdots + m\angle n = 360°$

Proof Ex. 51, p. 366

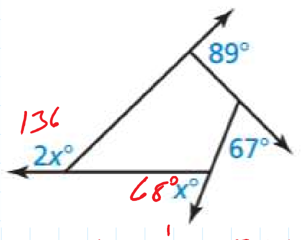


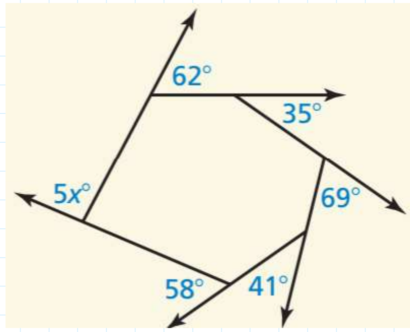


$90 \cdot 4 = 360°$



Find the value of x in the diagram.





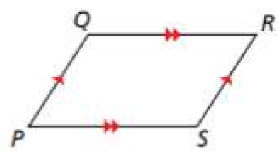
$2x + x + 67 + 89 = 360$

$3x + 156 = 360$

$\frac{3x}{3} = \frac{204}{3}$

$x = 68$

A **parallelogram** is a quadrilateral with both pairs of opposite sides parallel. In $\square PQRS$, $\overline{PQ} \parallel \overline{RS}$ and $\overline{QR} \parallel \overline{PS}$ by definition. The theorems below describe other properties of parallelograms.

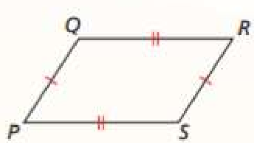


Theorem 7.3 Parallelogram Opposite Sides Theorem

If a quadrilateral is a parallelogram, then its opposite sides are congruent.

If $PQRS$ is a parallelogram, then $\overline{PQ} \cong \overline{RS}$ and $\overline{QR} \cong \overline{SP}$.

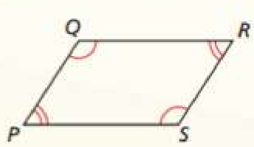
Proof p. 368



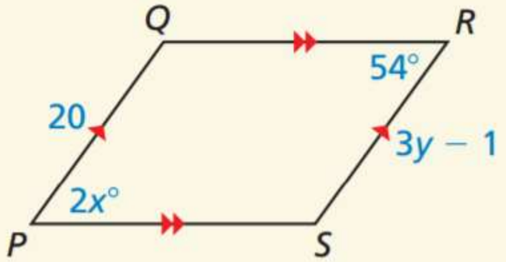
Theorem 7.4 Parallelogram Opposite Angles Theorem

If a quadrilateral is a parallelogram, then its opposite angles are congruent.

If $PQRS$ is a parallelogram, then $\angle P \cong \angle R$ and $\angle Q \cong \angle S$.



Find the values of x and y.



$2x = 54$

$\boxed{x = 27}$

$20 = 3y - 1$

$21 = 3y$

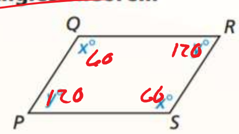
$\boxed{7 = y}$

Theorem 7.5 Parallelogram Consecutive Angles Theorem

If a quadrilateral is a parallelogram, then its consecutive angles are supplementary.

If $PQRS$ is a parallelogram, then $x° + y° = 180°$.

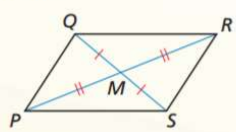
Proof Ex. 38, p. 373

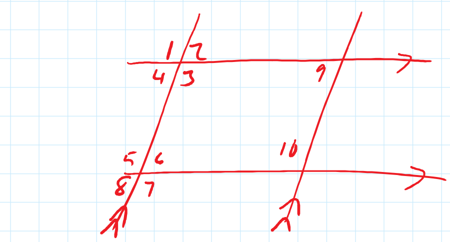


Theorem 7.6 Parallelogram Diagonals Theorem

If a quadrilateral is a parallelogram, then its diagonals bisect each other.

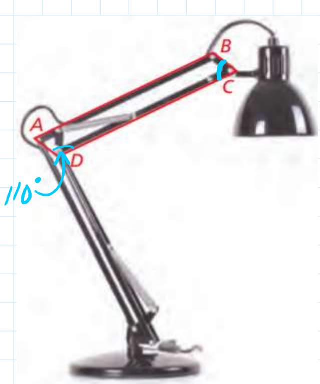
If $PQRS$ is a parallelogram, then $\overline{QM} \cong \overline{SM}$ and $\overline{PM} \cong \overline{RM}$.





$\angle 3, \angle 6$ Consecutive Int. $\angle$s

As shown, part of the extending arm of a desk lamp is a parallelogram. The angles of the parallelogram change as the lamp is raised and lowered. Find $m\angle BCD$ when $m\angle ADC = 110°$.



$110 + C = 180$

$-110 \quad -110$

$C = 70$

$\boxed{m\angle BCD = 70°}$

Practice sec 7.1 **pg. 364: 1-25EOO, 27, 29, 37-41EO;** Sec 7.2 **pg. 372: 3-19EO**

7.2 & 7.3 Properties of Parallelograms

Monday, January 23, 2017 2:59 PM

What You Will Learn

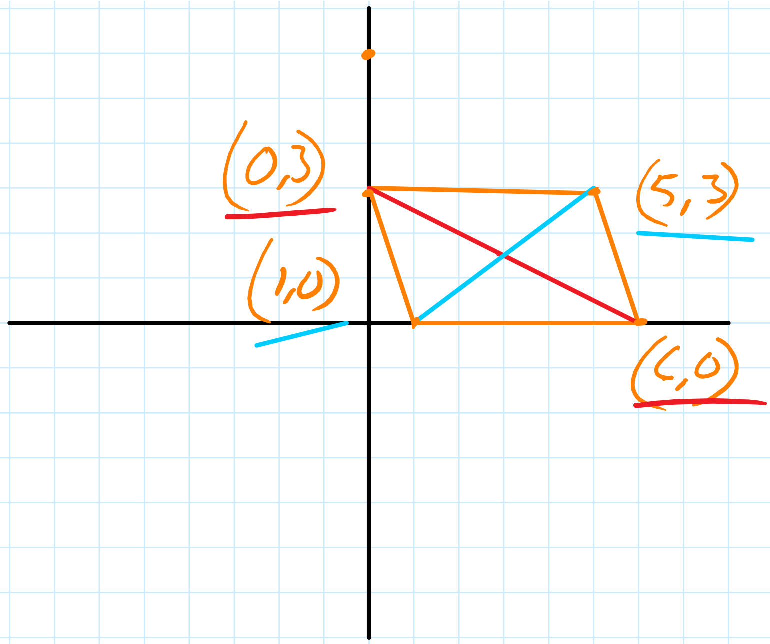
- Identify and verify parallelograms.
- Show that a quadrilateral is a parallelogram in the coordinate plane.
- Use parallelograms in the coordinate plane.

Find the coordinates of the intersection of the diagonals of ▱*ABCD* with vertices $A(1, 0)$, $B(6, 0)$, $C(5, 3)$, and $D(0, 3)$.

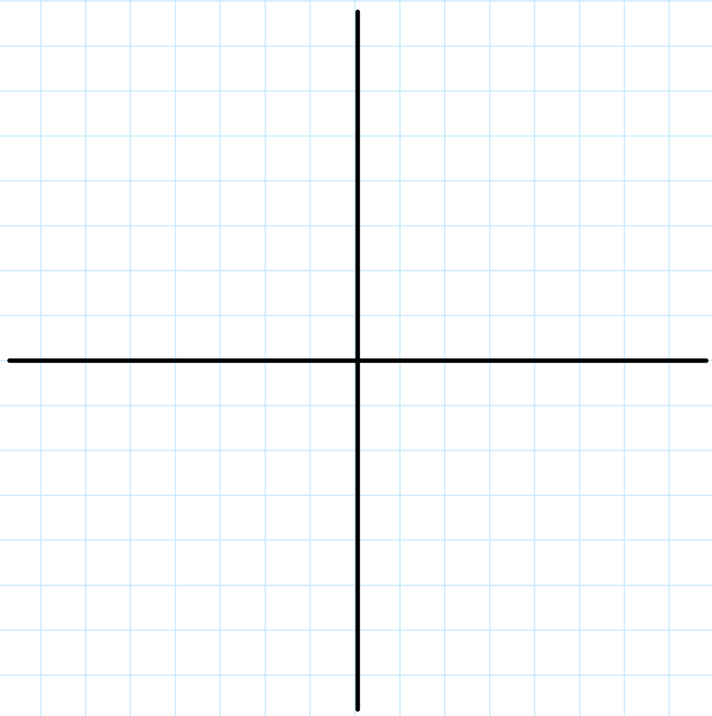
$\left(\frac{0+6}{2}, \frac{3+0}{2}\right)$ $\left(3, \frac{3}{2}\right)$

$\left(\frac{1+5}{2}, \frac{0+3}{2}\right)$

$\left(\frac{6}{2}, \frac{3}{2}\right) = \left(3, \frac{3}{2}\right)$

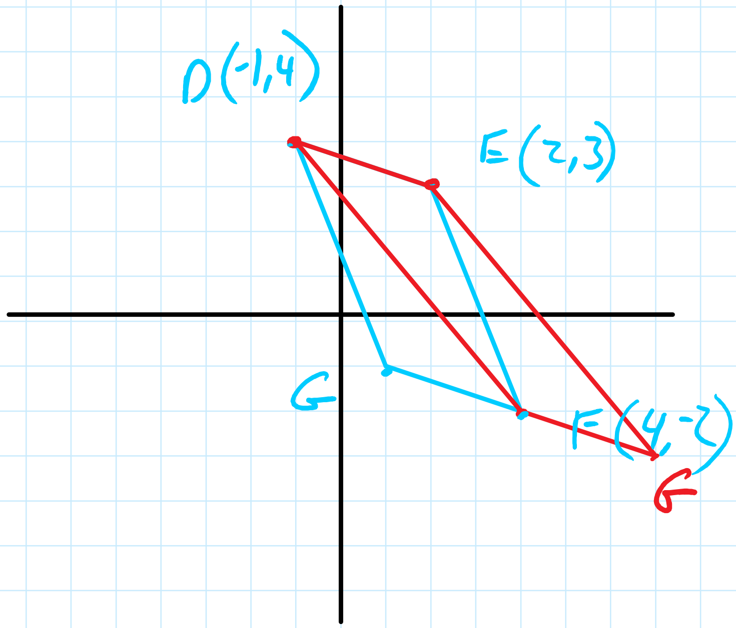


Find the coordinates of the intersection of the diagonals of $\square STUV$ with vertices $S(-2, 3)$, $T(1, 5)$, $U(6, 3)$, and $V(3, 1)$.



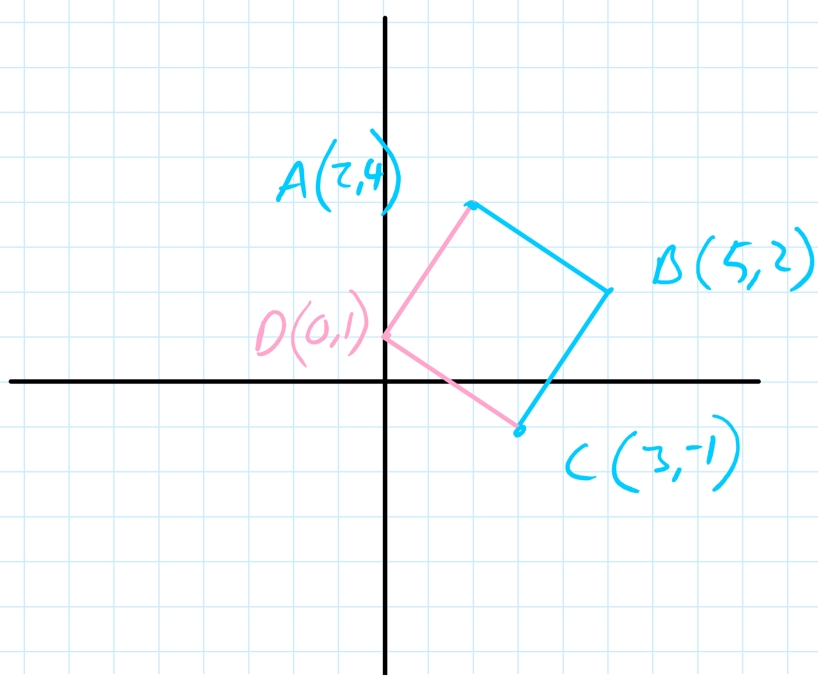
Three vertices of ▱$DEFG$ are $D(-1, 4)$, $E(2, 3)$, and $F(4, -2)$. Find the coordinates of vertex G.

$\boxed{G(1, -1)}$



Three vertices of ▱$ABCD$ are $A(2, 4)$, $B(5, 2)$, and $C(3, -1)$. Find the coordinates of vertex D.

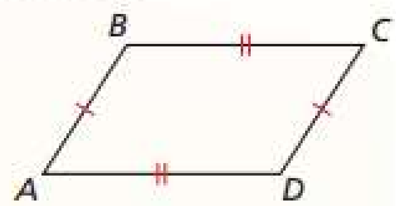
$\boxed{D(0, 1)}$



Theorem 7.7 Parallelogram Opposite Sides Converse

If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram.

If $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$, then $ABCD$ is a parallelogram.

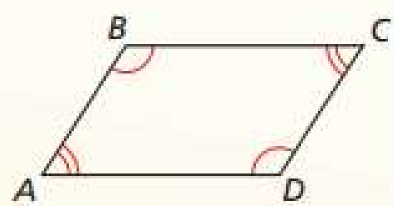


Theorem 7.8 Parallelogram Opposite Angles Converse

If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram.

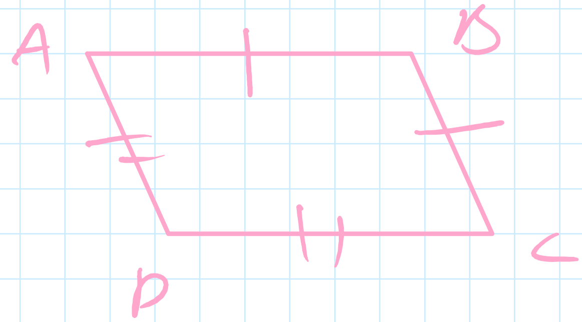
If $\angle A \cong \angle C$ and $\angle B \cong \angle D$, then $ABCD$ is a parallelogram.

Proof Ex. 39, p. 383



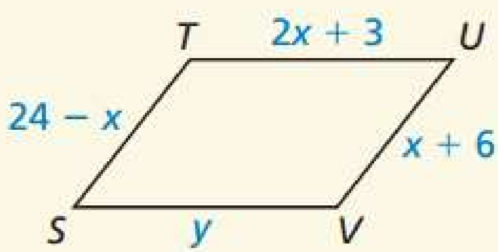
In quadrilateral $ABCD$, $AB = BC$ and $CD = AD$. Is $ABCD$ a parallelogram? Explain your reasoning.

No, opposite sides are not congruent.



Finding Side Lengths of a Parallelogram

For what values of x and y is quadrilateral $STUV$ a parallelogram?



$24 - x = x + 6$

$24 = 2x + 6$

$18 = 2x$

$\boxed{9 = x}$

$2x + 3 = y$; $x = 9$

$2 \cdot 9 + 3 = y$

$18 + 3 = y$

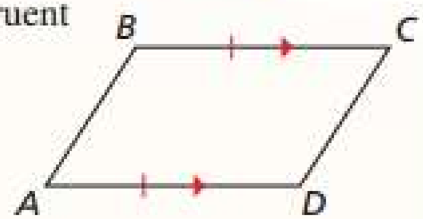
$\boxed{21 = y}$

$\boxed{21 = y}$

Theorem 7.9 Opposite Sides Parallel and Congruent Theorem

If one pair of opposite sides of a quadrilateral are congruent and parallel, then the quadrilateral is a parallelogram.

If $\overline{BC} \parallel \overline{AD}$ and $\overline{BC} \cong \overline{AD}$, then $ABCD$ is a parallelogram.

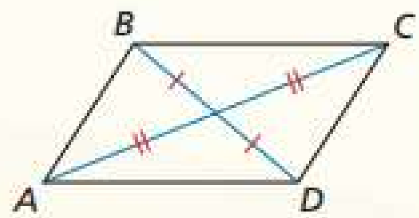


Proof Ex. 40, p. 383

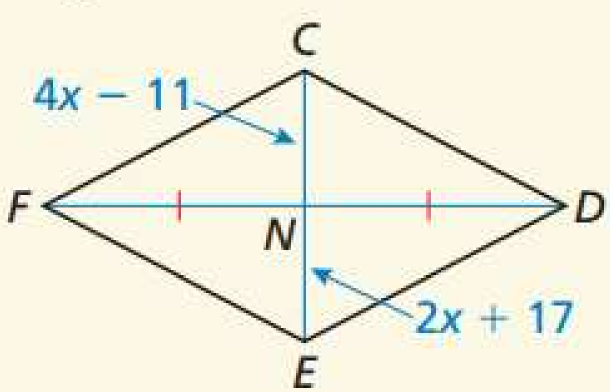
Theorem 7.10 Parallelogram Diagonals Converse

If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.

If $\overline{BD}$ and $\overline{AC}$ bisect each other, then $ABCD$ is a parallelogram.



For what value of x is quadrilateral $CDEF$ a parallelogram?



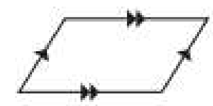
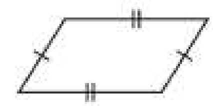
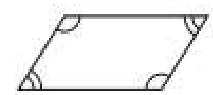
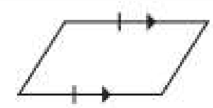
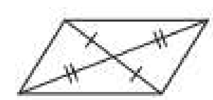
$4y - 11 = 2x + 17$

$2x - 11 = 17$

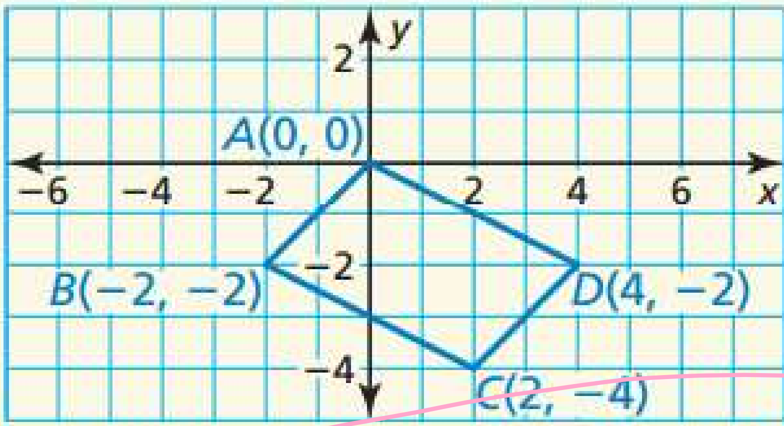
$2x = 28$

$\boxed{x = 14}$

Ways to Prove a Quadrilateral Is a Parallelogram

1. Show that both pairs of opposite sides are parallel. *(Definition)*	
2. Show that both pairs of opposite sides are congruent. *(Parallelogram Opposite Sides Converse)*	
3. Show that both pairs of opposite angles are congruent. *(Parallelogram Opposite Angles Converse)*	
4. Show that one pair of opposite sides are congruent and parallel. *(Opposite Sides Parallel and Congruent Theorem)*	
5. Show that the diagonals bisect each other. *(Parallelogram Diagonals Converse)*	

Show that quadrilateral *ABCD* is a parallelogram.



$m\overline{AB} = \frac{2}{2} = 1$

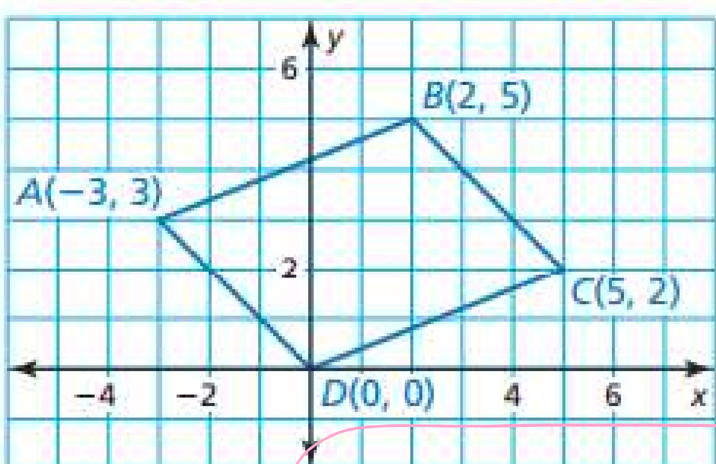
$m\overline{CD} = \frac{2}{2} = 1$

$m\overline{AD} = \frac{-2}{4} = -\frac{1}{2}$

$m\overline{CB} = \frac{-2}{4} = -\frac{1}{2}$

yes, ABCD is a parallelogram

Show that quadrilateral *ABCD* is a parallelogram.



$m\overline{AB} = \frac{2}{5}$

$m\overline{CD} = \frac{2}{5}$

$m\overline{BC} = \frac{-3}{3} = -1$

$m\overline{AD} = \frac{-3}{3} = -1$

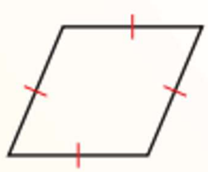
yes, ABCD is a parallelogram

Practice sec 7.2 **pg. 372: 25-27A, 29;** sec 7.3 **pg. 381: 1, 3-9A, 11-19EO**

What You Will Learn

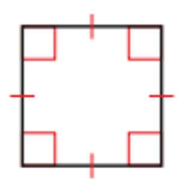
- Use properties of special parallelograms.
- Use properties of diagonals of special parallelograms.
- Use coordinate geometry to identify special types of parallelograms.

Rhombuses, Rectangles, and Squares



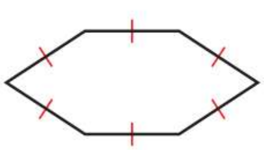
A **rhombus** is a parallelogram with four congruent sides.

A **rectangle** is a parallelogram with four right angles.

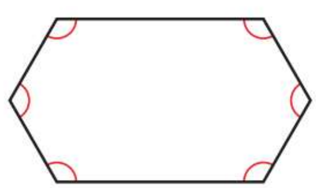


A **square** is a parallelogram with four congruent sides and four right angles.

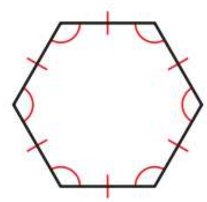
In an **equilateral polygon**, all sides are congruent.

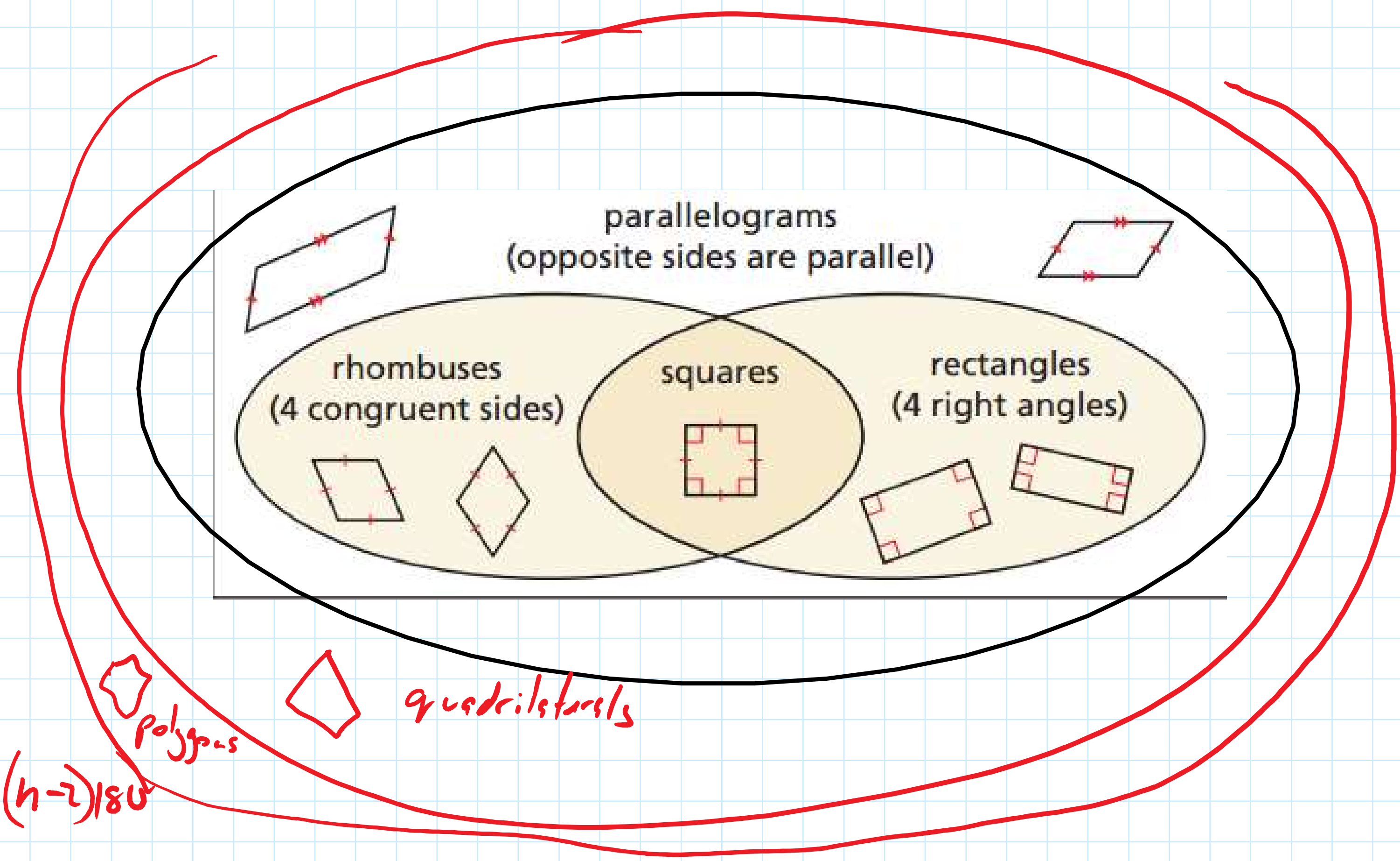


In an **equiangular polygon**, all angles in the interior of the polygon are congruent.



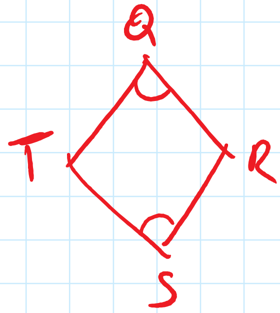
A **regular polygon** is a convex polygon that is both equilateral and equiangular.




parallelograms
(opposite sides are parallel)
rhombuses
(4 congruent sides)
squares
rectangles
(4 right angles)
quadrilaterals
polygons
(n-2)180

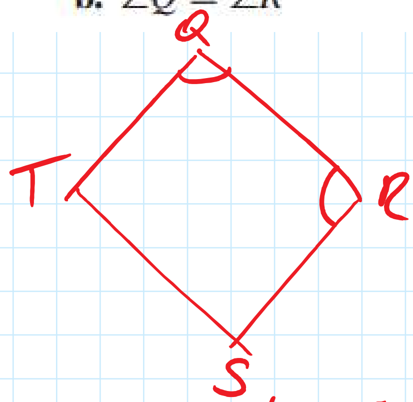
For any rhombus $QRST$, decide whether the statement is *always* or *sometimes* true. Draw a diagram and explain your reasoning.

a. $\angle Q \cong \angle S$



Always True because Rhombus' are Parallelograms and oppo. ∠s are ≅

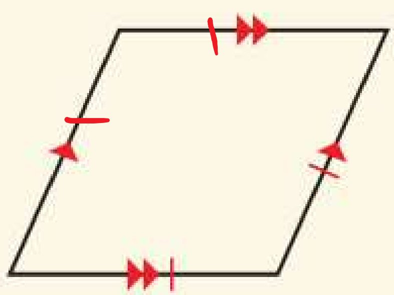
b. $\angle Q \cong \angle R$



Sometimes True because when consecutive ∠s are ≅ the Rhombus becomes a square and not all Rhombus' are squares

---

Classify the special quadrilateral. Explain your reasoning.



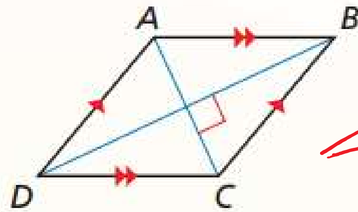
Rhombus

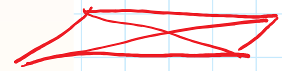
Theorem 7.11 **Rhombus Diagonals Theorem**

A parallelogram is a rhombus if and only if its diagonals are perpendicular.

$\square ABCD$ is a rhombus if and only if $\overline{AC} \perp \overline{BD}$.

Proof p. 390; Ex. 72, p. 395

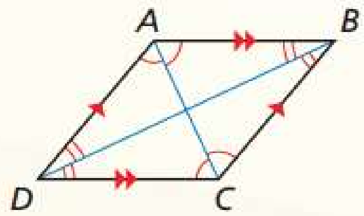




Theorem 7.12 **Rhombus Opposite Angles Theorem**

A parallelogram is a rhombus if and only if each diagonal bisects a pair of opposite angles.

$\square ABCD$ is a rhombus if and only if $\overline{AC}$ bisects $\angle BCD$ and $\angle BAD$, and $\overline{BD}$ bisects $\angle ABC$ and $\angle ADC$.



Find the measures of the numbered angles in rhombus $ABCD$.

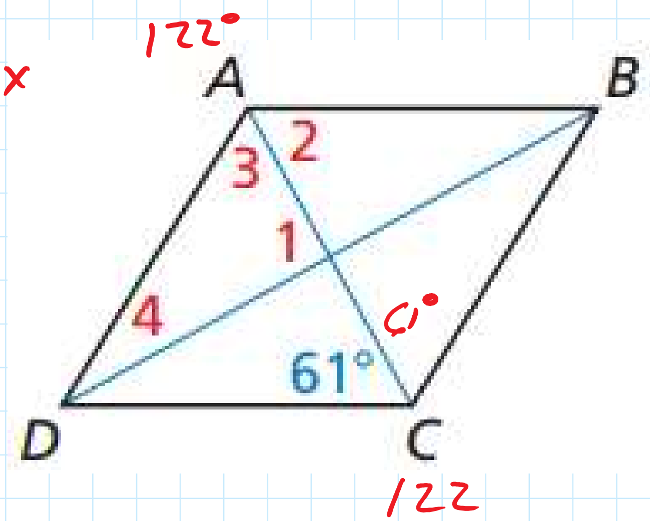
$m\angle 1 = 90°$

$m\angle 2 = 61°$

$m\angle 3 = 61°$

$m\angle 4 = 29°$

$360 = 244 + 2x$

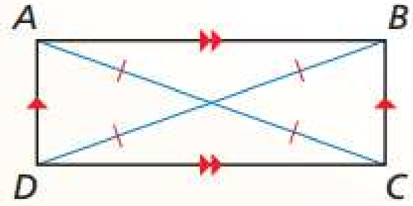


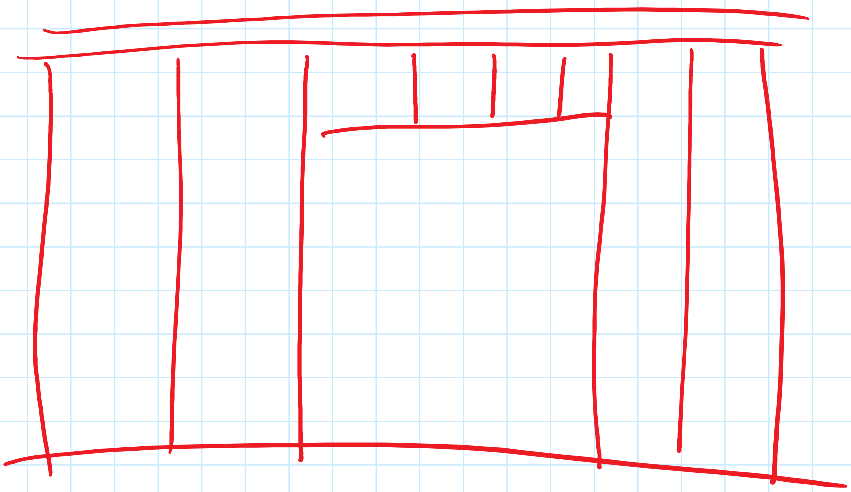
Theorem 7.13 Rectangle Diagonals Theorem

A parallelogram is a rectangle if and only if its diagonals are congruent.

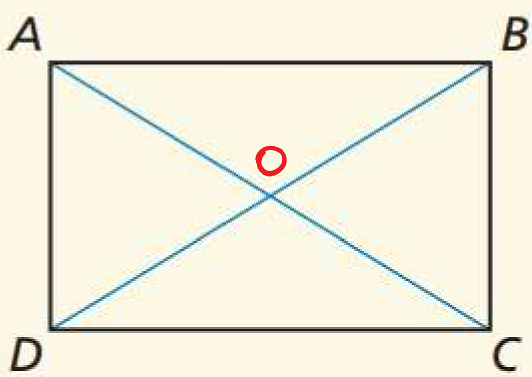
$\square ABCD$ is a rectangle if and only if $\overline{AC} \cong \overline{BD}$.

Proof Exs. 87 and 88, p. 396





In rectangle *ABCD*, *AC* = 7*x* − 15 and *BD* = 2*x* + 25. ~~Find the lengths of the diagonals of *ABCD*.~~



$AO = 20\frac{1}{2}$

$2x + 25 = 7x - \cancel{15}$

$+15 \quad \cancel{+15}$

$2x + 40 = 7x$

$-2x \quad -2x$

$40 = 5x$

$8 = x$

$2x + 25$; $x = 8$

$2 \cdot 8 + 25$

41

Decide whether ▱$ABCD$ with vertices $A(-2, 3)$, $B(2, 2)$, $C(1, -2)$, and $D(-3, -1)$ is a *rectangle*, a *rhombus*, or a *square*.

$m\,\overline{AB} = \frac{-1}{4}$

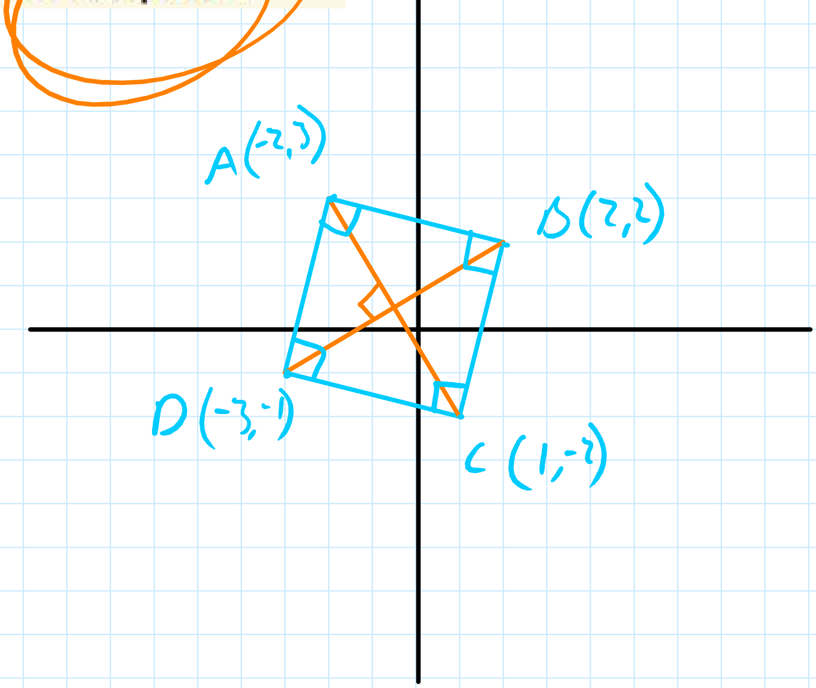
$m\,\overline{CD} = \frac{-1}{4}$

$m\,\overline{AD} = \frac{4}{1}$

$m\,\overline{BC} = \frac{4}{1}$

$m\,\overline{BD} = \frac{3}{5}$

$m\,\overline{AC} = \frac{-5}{3}$



Practice sec 7.4 **pg. 393: 1-3A, 7-21EOO, 23-35EO, 43-57EOO**

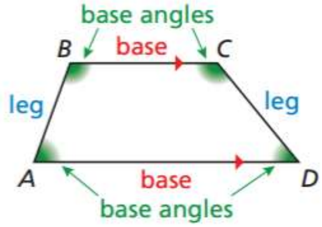
What You Will Learn

- Use properties of trapezoids.
- Use the Trapezoid Midsegment Theorem to find distances.
- Use properties of kites.
- Identify quadrilaterals.

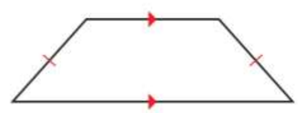
Using Properties of Trapezoids

A **trapezoid** is a quadrilateral with exactly one pair of parallel sides. The parallel sides are the **bases**.

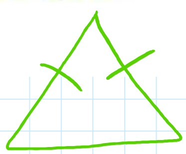
Base angles of a trapezoid are two consecutive angles whose common side is a base. A trapezoid has two pairs of base angles. For example, in trapezoid *ABCD*, $\angle A$ and $\angle D$ are one pair of base angles, and $\angle B$ and $\angle C$ are the second pair. The nonparallel sides are the **legs** of the trapezoid.



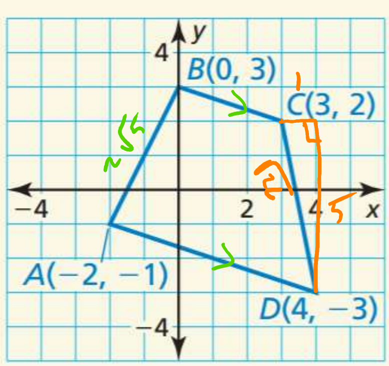
If the legs of a trapezoid are congruent, then the trapezoid is an **isosceles trapezoid**.



Isosceles trapezoid



Show that *ABCD* is a trapezoid and decide whether it is isosceles.



$m\overline{BC} = \frac{-1}{3}$

$m\overline{AD} = \frac{-2}{6} = \frac{-1}{3}$

$m\overline{AB} = \frac{4}{2} = 2$

$m\overline{CD} = \frac{-5}{1} = -5$

establishes Trapezoid

Not isoceles

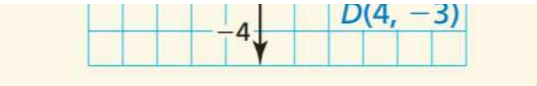
$D = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$a^2+b^2=c^2$

$AB = \sqrt{(-2-0)^2+(-1+3)^2}$

$\sqrt{(-2)^2+(-4)^2}$

20



26
2 13

$a^2+b^2=c^2$
$1^2+5^2=c^2$
$1+25=c^2$
$\sqrt{26}=c$

$\sqrt{(-2)^2+(-4)^2}$
$\sqrt{4+16}$
$\sqrt{20}$
$AB = 2\sqrt{5}$

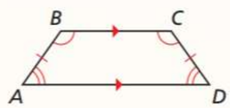
20
2 10
2 5

Theorem 7.14 Isosceles Trapezoid Base Angles Theorem

If a trapezoid is isosceles, then each pair of base angles is congruent.

If trapezoid *ABCD* is isosceles, then $\angle A \cong \angle D$ and $\angle B \cong \angle C$.

Proof Ex. 39, p. 405

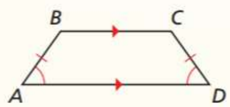


Theorem 7.15 Isosceles Trapezoid Base Angles Converse

If a trapezoid has a pair of congruent base angles, then it is an isosceles trapezoid.

If $\angle A \cong \angle D$ (or if $\angle B \cong \angle C$), then trapezoid *ABCD* is isosceles.

Proof Ex. 40, p. 405

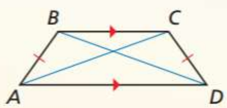


Theorem 7.16 Isosceles Trapezoid Diagonals Theorem

A trapezoid is isosceles if and only if its diagonals are congruent.

Trapezoid *ABCD* is isosceles if and only if $\overline{AC} \cong \overline{BD}$.

Proof Ex. 51, p. 406

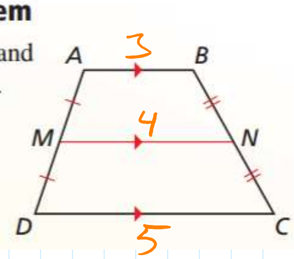


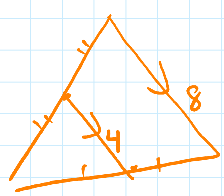
Theorem 7.17 Trapezoid Midsegment Theorem

The midsegment of a trapezoid is parallel to each base, and its length is one-half the sum of the lengths of the bases.

If $\overline{MN}$ is the midsegment of trapezoid *ABCD*, then $\overline{MN} \parallel \overline{AB}$, $\overline{MN} \parallel \overline{DC}$, and $MN = \frac{1}{2}(AB + CD)$.

Proof Ex. 49, p. 406



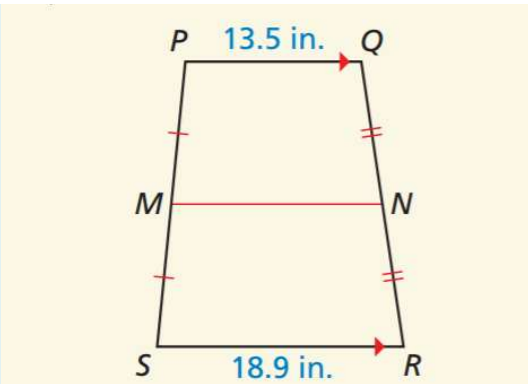


$\frac{5+3}{2}$

In the diagram, $\overline{MN}$ is the midsegment of trapezoid *PQRS*. Find *MN*.

$\boxed{MN = 16.2\text{ in}}$

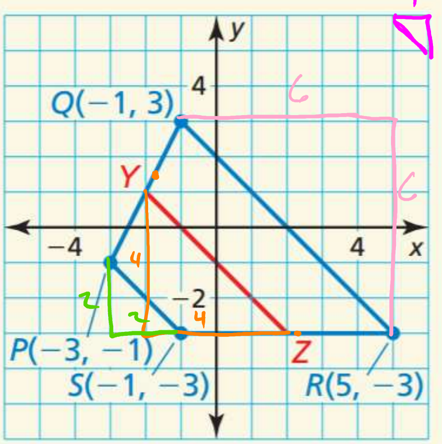
$\frac{13.5 + 18.9}{2} = MN$



$\frac{13.5 + 18.9}{2} = MN$

$\frac{32.4}{2} = \boxed{16.2 \text{ in}}$

Find the length of midsegment $\overline{YZ}$ in trapezoid $PQRS$.



$4^2 + 4^2 = c^2$
$16 + 16 = c^2$
$\sqrt{32} = c$
$4\sqrt{2} = c$

$2^2 + 2^2 = c^2$
$4 + 4 = c^2$
$\sqrt{8} = c$
$2\sqrt{2} = c$

$6^2 + 6^2 = c^2$
$36 + 36 = c^2$
$\sqrt{72} = c$
$6\sqrt{2} = c$

$3 \cdot 2\sqrt{2}$
$6\sqrt{2}$

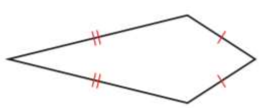
$2x + 6x$

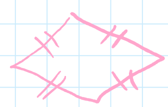
$\frac{2\sqrt{2} + 6\sqrt{2}}{2} = \frac{8\sqrt{2}}{2}$
$4\sqrt{2}$

$1^2 + 1^2 = c^2$
$1 + 1 = c^2$
$\sqrt{2} = c \approx 1.414\ldots$

Using Properties of Kites

A **kite** is a quadrilateral that has two pairs of consecutive congruent sides, but opposite sides are not congruent.





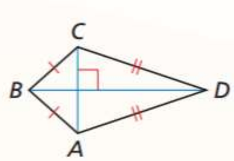
Rhombus, Not Kite

Theorem 7.18 Kite Diagonals Theorem

If a quadrilateral is a kite, then its diagonals are perpendicular.

If quadrilateral $ABCD$ is a kite, then $\overline{AC} \perp \overline{BD}$.

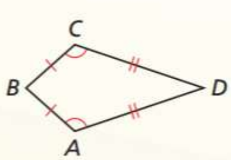
Proof p. 401



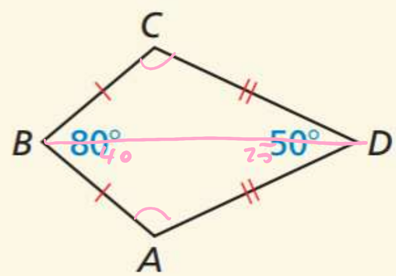
Theorem 7.19 Kite Opposite Angles Theorem

If a quadrilateral is a kite, then exactly one pair of opposite angles are congruent.

If quadrilateral $ABCD$ is a kite and $\overline{BC} \cong \overline{BA}$, then $\angle A \cong \angle C$ and $\angle B \ncong \angle D$.



Find $m\angle C$ in the kite shown.



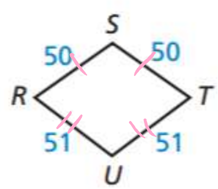
$80+50+2\alpha=360$
$130+2\alpha=360$
$-130 \quad -130$
$2\alpha=230$
$\alpha=115$

$(n-2)180$
$(4-2)180$
360

$m\angle C=115^\circ$

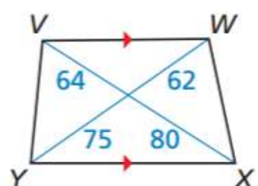
Give the most specific name for the quadrilateral. Explain your reasoning.

8.



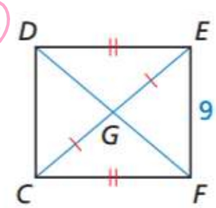
Kite

9.



$144 \neq 137$
Trapezoid

10.

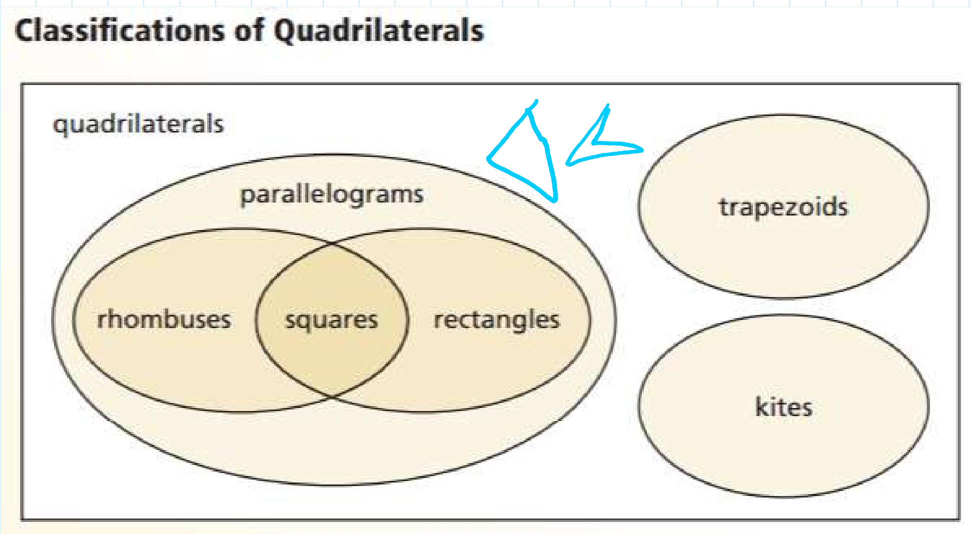


Quadrilateral

Quadrilateral Parallelogram Rhombus Rectangle Square
Trapezoid Isosceles Trapezoid Kite

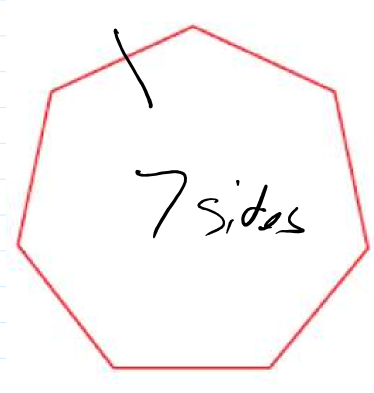
Practice sec 7.5 **pg. 403: 1-17EO, 21-33EO**

Chapter 7 Review



Use the picture of the regular convex polygon to answer the following questions. Make sure to show your work.

Use the picture of the regular convex polygon to answer the following questions. Make sure to show your work.



1. What is the sum of the interior angles?

$(n-2)180 \quad (7-2)180$

$900°$

2. What is the sum of the exterior angles?

$360°$

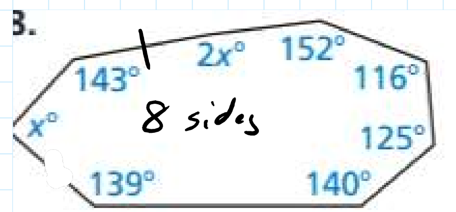
3. What is the measure of each interior angle?

$\frac{900°}{7} \approx 128.4°$

4. What is the measure of each exterior angle?

$\frac{360°}{7} \approx 51.6°$

Write an equation and then solve to find the value of x.



$(n-2)180$

$(8-2)180$

1080

$143+2x+152+116+125+140+139+x=1080$

$815+3x=1080$

$\frac{3x}{3}=\frac{265}{3}$

$x=\frac{265°}{3} \approx 88.3°$

Find the measure of each exterior angle of a regular polygon in which the sum of the measures of the interior angles is 1980°. Show your work.

$$\frac{(n-2)180}{180} = \frac{1980}{180}$$

$n-2 = 11$

$+2 \quad +2$

$n = 13$

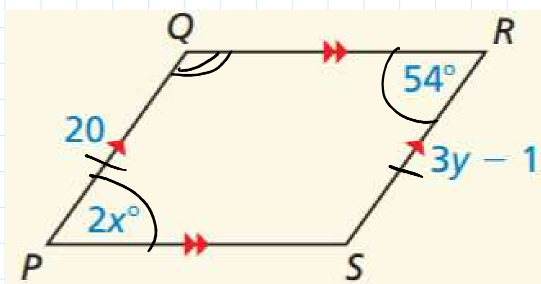
$\frac{360^\circ}{13}$ = ext. angle measure

27.7 good

$$\boxed{\frac{360^\circ}{13} \approx 27.7^\circ}$$

PQRS is a parallelogram. Use the picture to find the indicated values or measures. Show your work.

Find y. = 7



Find x. = 27

Find m∠PQR = 126°

$3y-1 = 20$

$3y = 21$

$y = 7$

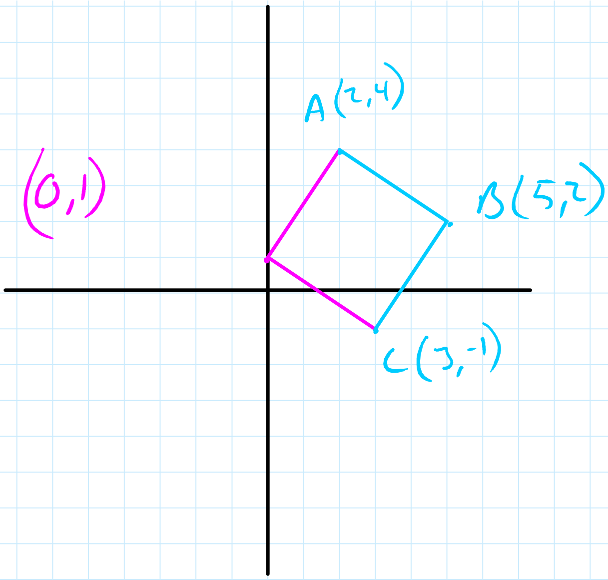
$\frac{2x}{2} = \frac{54}{2}$

$x = 27$

$54 + x = 180$

$x = 126$

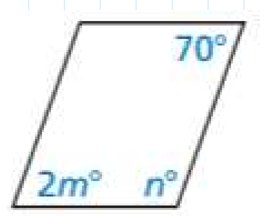
Three vertices of ▱$ABCD$ are $A(2, 4)$, $B(5, 2)$, and $C(3, -1)$. Find the coordinates of vertex D.



$\frac{3}{2} = \frac{3}{2}$ ✓

$\frac{-2}{3} = \frac{-2}{3}$ ✓

Find the values of m and n that make the quadrilateral a parallelogram.



$2m = 70$

$\boxed{m = 35}$

$n + 70 = 180$

$\boxed{n = 110}$

$70 + 70 + 2n = 360$

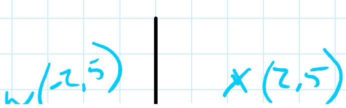
$140 + 2n = 360$

$2n = 220$

$\boxed{n = 110}$

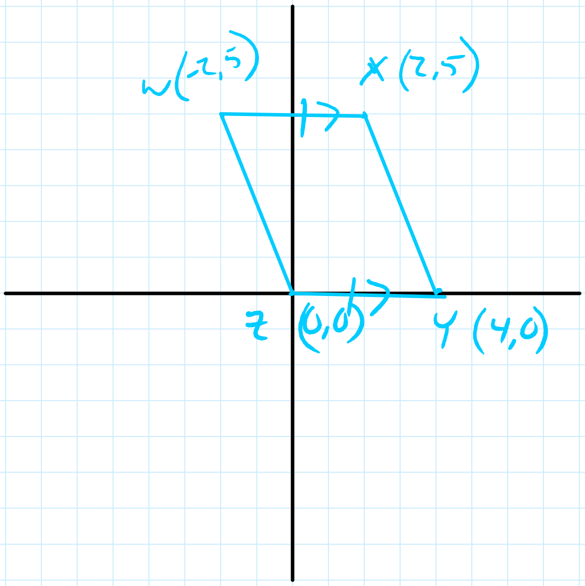
Use mathematical computations to show that quadrilateral WXYZ is a parallelogram.

W(−2, 5), X(2, 5), Y(4, 0), Z(0, 0)



$m\,\overline{WX} = \frac{0}{4} = 0$

$m\,\overline{YZ} = \frac{0}{4} = 0$



$m\,\overline{YZ} = \frac{0}{4} = 0$

$m\,\overline{WZ} = \frac{-5}{2}$

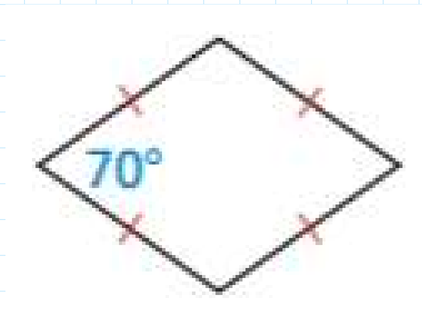
$m\,\overline{XY} = \frac{-5}{2}$

$WX = 4$

$ZY = 4$

Circle all names that apply to the given shape.

Quadrilateral
Parallelogram
Rhombus
Rectangle
Square
Kite
trapezoid



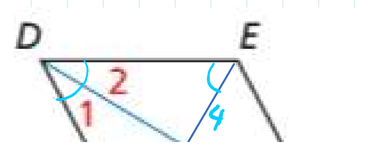
The diagonals of rhombus DEFG intersect at P. Given that PE=4 find the indicated measures.

$\frac{118}{2} = 59°$

m∠DEG= 59°

m∠EDG= 121°

$D + 59 = 180$

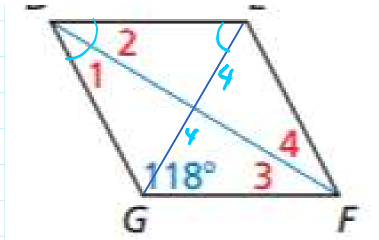


m∠EDG= 121°

GE= 8

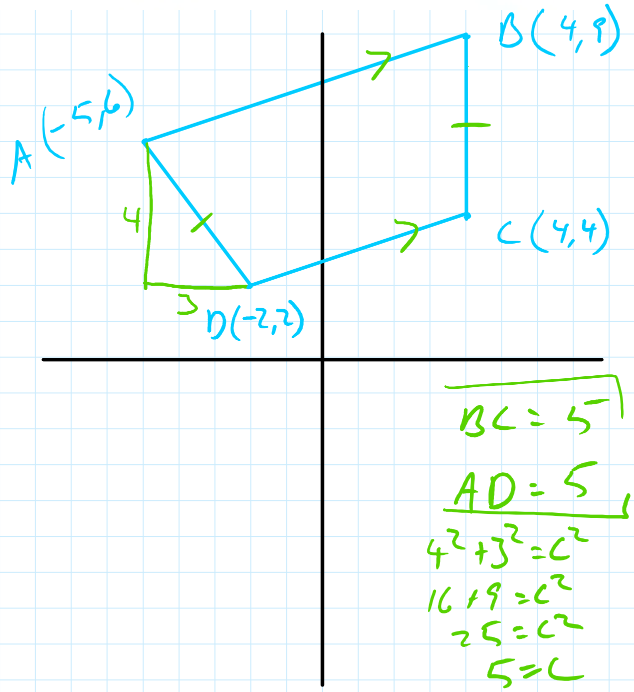
$D + 59 = 180$

$D = 121$



Determine if the given points represent the vertices of a trapezoid. If so, determine whether it is isosceles or not.

$A(-5, 6)$, $B(4, 9)$, $C(4, 4)$, and $D(-2, 2)$



$m\,\overline{AB} = \frac{3}{9} = \frac{1}{3}$

$m\,\overline{CD} = \frac{2}{6} = \frac{1}{3}$

$m\,\overline{AD} = \frac{-4}{3}$

$m\,\overline{BC} = \frac{-5}{0} = \text{undef.}$

Trap.

$BC = 5$

$AD = 5$

$4^2 + 3^2 = c^2$

$16 + 9 = c^2$

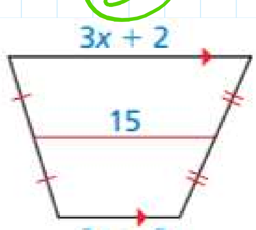
$25 = c^2$

$5 = c$

$\boxed{\text{Isoceles Trap}}$

Find the length of the 2 bases of the trapezoid. Show your work.

20



$\boxed{\frac{b_1 + b_2}{2} = \text{midsegment}}$

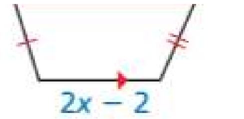
$3x+2;\ x=6$

$3 \cdot 6 + 2$

$18 + 2$

20

$\left(\frac{3x+2+2x-2}{...}\right) = (15)\,2$



$2\cdot6-2$

$12-2$

10

18+2

20

$\cancel{2}\left(\frac{3x+2+2x-2}{\cancel{2}}\right)=(15)2$

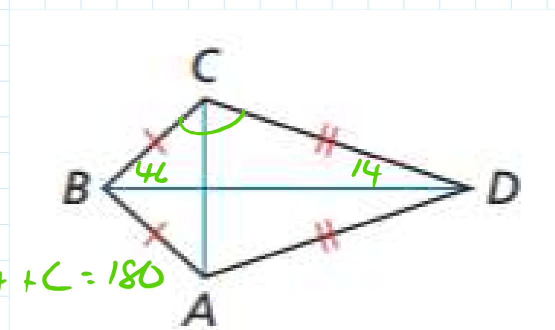
$3x+2+2x-2=30$

$\frac{5x}{5}=\frac{30}{5}$

$x=6$

In kite ABCD, m∠CDB=14°, and m∠CBD=46°
Find the indicated measure.

m∠BCD= 120°



$46+14+C=180$

$60+C=180$

$C=120$

The End!

23 total questions
Notecard allowed!

Good luck