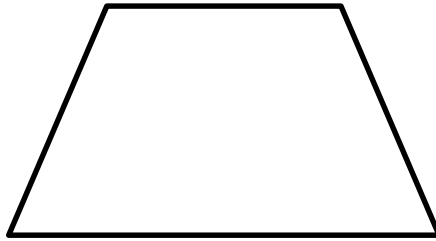# Trapezoid and Isosceles Trapezoid

1. Defining characteristic: one pair of sides must be _____

2. Defining characteristic of an isosceles trapezoid: the pair of non-parallel sides must be: _____

3. Each pair of angles on the same base of an isosceles trapezoid must be: _____

4. A pair of angles from different bases of an isosceles trapezoid must be: _____
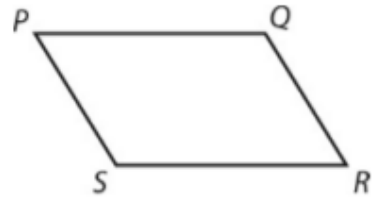

Isosceles Trapezoid

Use the figure for 1–3.
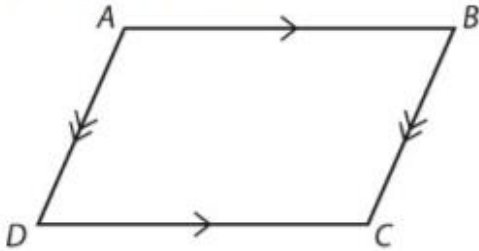
1. List the congruent sides.

_____

2. List the congruent angles.

_____

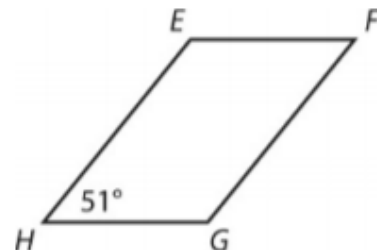3. Name two consecutive angle pairs that include $\angle C$.
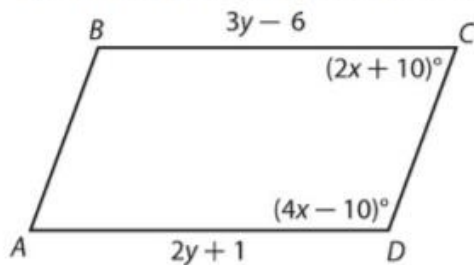
_____

Use parallelogram *PQRS* for 4–5.

4. If $m\angle P = 2x°$, $m\angle R = 62°$, find the value for x.

_____

5. If $QR = 16$ feet and $PS = 3y - 5$ feet, find the value for y.

_____

6. Find the unknown angle measures.

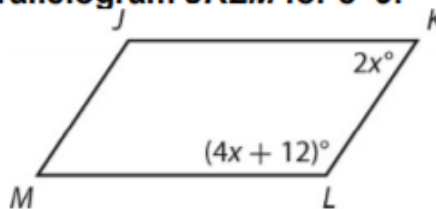

_____

For 6–8, use the parallelogram below.

B $3y - 6$ C
$(2x + 10)°$
$(4x - 10)°$
A $2y + 1$ D

6. What is m∠C?

_____

7. What is m∠B?

_____

8. What is AD?

_____

7. In parallelogram RSTU, $\overline{RS} \parallel \overline{TU}$ and $\overline{ST} \parallel \overline{UR}$. If ST = 9 inches and TU = 4 inches, find RS and UR.
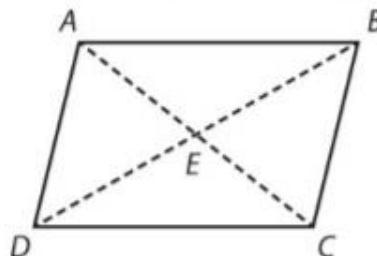
_____

Use parallelogram JKLM for 8–9.

J K
$2x°$
$(4x + 12)°$
M L

8. What is the value of x?

_____

9. What are the measures of all of the interior angles of the parallelogram?

_____

Use the following information for 10–13.

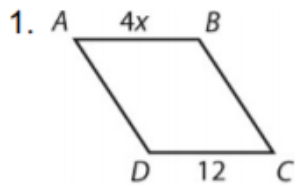**In parallelogram CDEF, AE = 3x + 4, EC = 2x + 8, BE = 4y + 1, and BD = 18.**
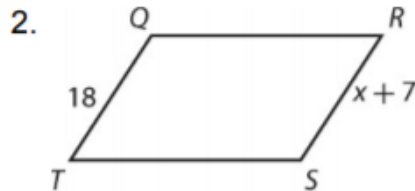
A B
E
D C

10. What are the values of x and y?

_____

11. What is the length of $\overline{EC}$?

_____

12. What is the length of $\overline{AC}$?

_____

13. What is the length of $\overline{ED}$?
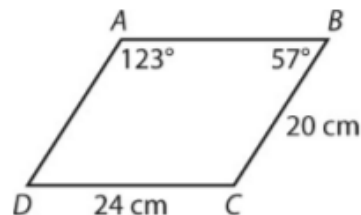
_____

Find the value of x for each parallelogram.

1. A ⎯4x⎯ B, D ⎯12⎯ C

_____

2. Q, R, 18, x + 7, T, S

_____

For 6–9, use parallelogram ABCD. Find each measure.

6. m∠C _____

7. m∠D _____

8. AB _____

9. DA _____

A, 123°, 57°, B, 20 cm, D, 24 cm, C

Find the value of x in each parallelogram.

10. S, (4x + 2)° T, R 106°, U

_____

11. H, 82°, I, (3x − 8)°, K, J

_____
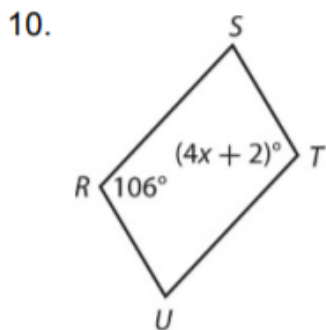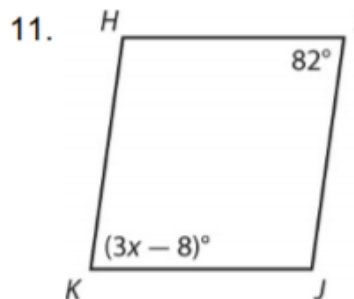
For 25–27, use the following information.
In parallelogram CDEF,
FG = 2x − 4, FD = 20, CG = 3y + 2, and GE = 5y − 6.

C, D, G, F, E
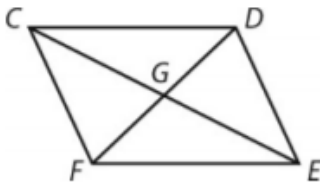
25. Find the values for x and y.

_____

26. What is the length of $\overline{GD}$?

_____

27. What is the length of $\overline{CE}$?

_____

1. Consider each of the following quadrilaterals. Decide whether each is also necessarily a parallelogram. Select Yes or No for A–C.

   A. Trapezoid   ◯ Yes   ◯ No

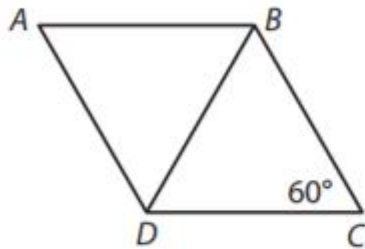   B. Rhombus   ◯ Yes   ◯ No

   C. Square   ◯ Yes   ◯ No

2. Which conclusions are valid given that ABCD is a parallelogram? Choose True or False for each statement.

   A. $\angle A \cong \angle C$ ◯ True   ◯ False

   B. $\angle A$ and $\angle B$ are complimentary.   ◯ True   ◯ False
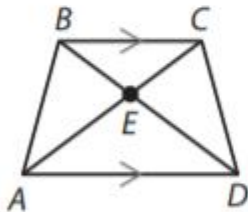
   C. $\overline{AD} \parallel \overline{BC}$ ◯ True   ◯ False

3. ABCD is a trapezoid with $\overline{BC} \parallel \overline{AD}$ and $\angle BAD \cong \angle CDA$. Which of the following statements are valid conclusions? Choose True or False for each statement.

   A. $\triangle ABC \cong \triangle DCA$ ◯ True   ◯ False

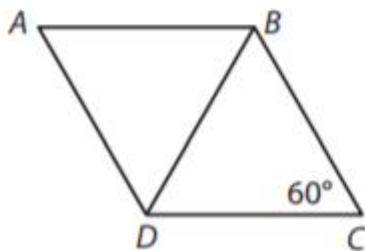   B. $\triangle BAD \cong \triangle CDA$ ◯ True   ◯ False

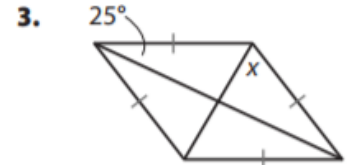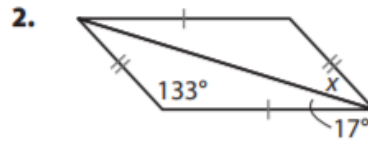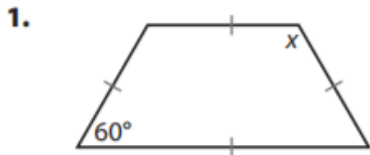   C. $\overline{AB} \cong \overline{BC}$ ◯ True   ◯ False

4. Given that ABCD is a rhombus, prove that $\triangle ABD \cong \triangle CDB$ and that both triangles are equilateral.
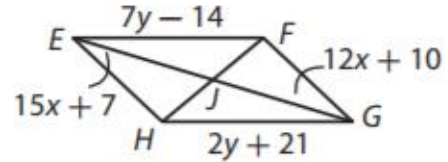
Find angle measure x on each given figure. *(Lessons 9.2, 9.4, 9.5)*

1.

60°

2.

133°
17°

3.

25°

EFGH is a parallelogram. Find the given side length. *(Lesson 9.1)*

1. EF

E $7y - 14$ F
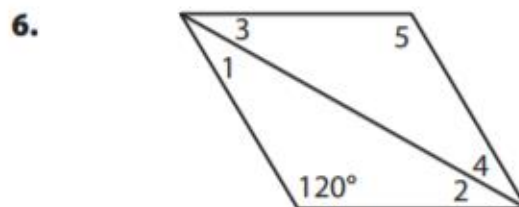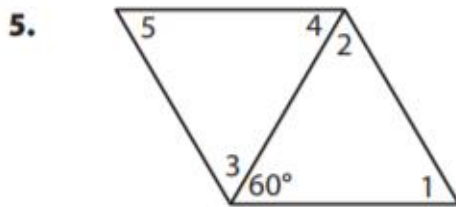$15x + 7$ J $-12x + 10$
H $2y + 21$ G

2. EG

Determine if each quadrilateral is a parallelogram. Justify your answer. *(Lesson 9.2)*

3.

4.

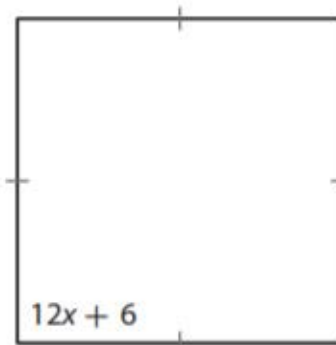**Find the measures of the numbered angles in each rhombus.** *(Lesson 9.3)*

5.

5 4 2
3 60° 1

6.

3 5
1
120° 4 2

Find the value of x that makes each parallelogram the given type. *(Lesson 9.4)*

7. Rectangle

$6x + 5$
$3x + 8$

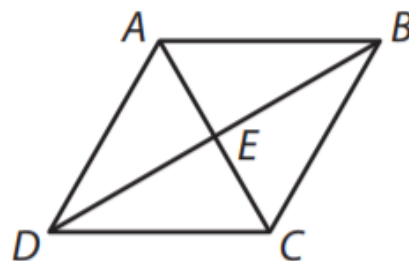**8.** Square

$12x + 6$
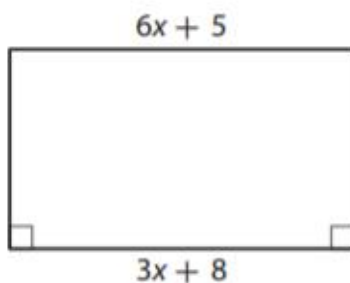
Use the following rhombus to solve the next two problems:

1. If m∠DAE = 55°, find the measures of ALL remaining angles.

2. If m∠AEB = (5x + 20)°, what is the value of x?

Example 1 **Prove that the opposite sides of a parallelogram are congruent.**

Given: $ABCD$ is a parallelogram.

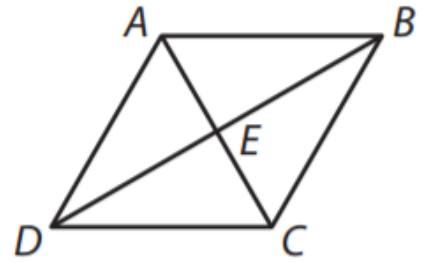Prove: $\overline{AB} \cong \overline{CD}$ and $\overline{AD} \cong \overline{CB}$
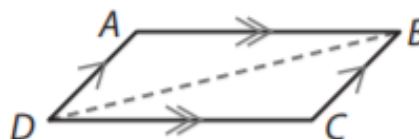
Statements	Reasons
3. $\overline{AB}\|\overline{DC}, \overline{AD}\|\overline{BC}$	3.
4. $\angle ADB \cong \angle CBD$ $\angle ABD \cong \angle CDB$	4.
5. $\overline{DB} \cong \overline{DB}$	5.
6.	6. ASA Triangle Congruence Theorem
7. $\overline{AB} \cong \overline{CD}$ and $\overline{AD} \cong \overline{CB}$	7.

Prove that the diagonals of a rhombus are perpendicular:
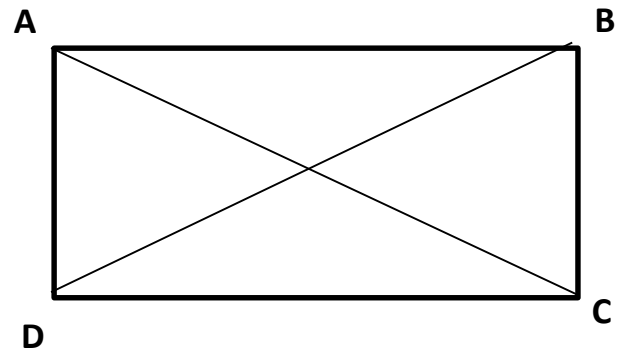
Given: ABCD is a Rhombus

Prove: AC ⊥ BD

Statements	Reasons

Prove that the diagonals of a rectangle are congruent:

Given: ABCD is a Rectangle

Prove: AC ≅ BD

Statements	Reasons