

Name: \_\_\_\_\_

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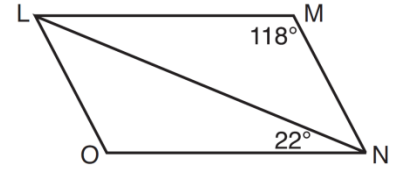
**UNIT 4**

**LESSON 3**

**AIM: WHAT ARE THE PROPERTIES OF RHOMBUS AND SQUARES?**

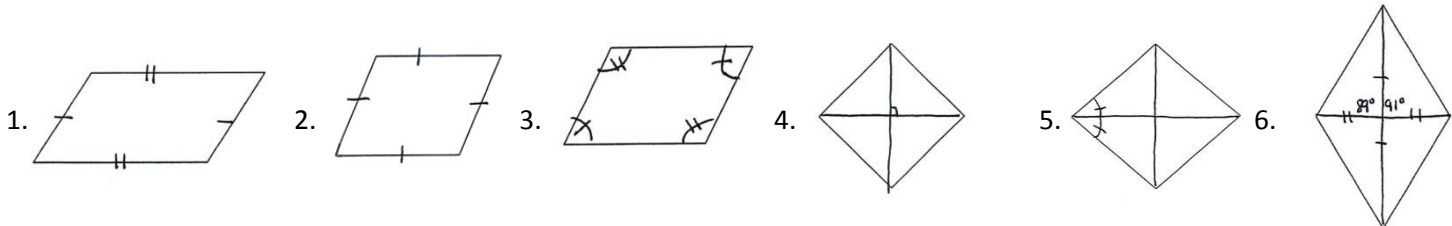
*Do Now:* The diagram below shows parallelogram  $LMNO$  with diagonal  $\overline{LN}$ ,  $m\angle M = 118^\circ$ , and  $m\angle LNO = 22^\circ$ .

*Explain why  $m\angle NLO$  is 40 degrees.*

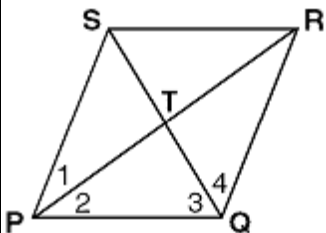


RHOMBUS	SQUARE
<p><b>ALL PROPERTIES OF A PARALLELOGRAM PLUS:</b></p> <ul style="list-style-type: none"> <li>• All sides are <b>CONGRUENT</b>.</li> <li>• Diagonals are <b>PERPENDICULAR BISECTORS</b>.</li> <li>• Diagonals bisect the <b>ANGLES</b>.</li> </ul>	<p><b>ALL PROPERTIES OF PARALLELOGRAMS, RECTANGLES AND RHOMBI!</b></p>

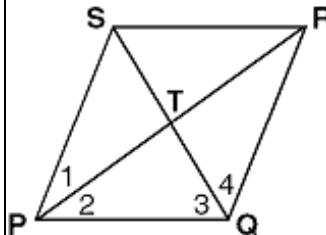
Judging by the markings on the picture and what you know about the properties of parallelograms and rhombi, state whether each shape is a parallelogram or a rhombus.



1. In the diagram below, PQRS is a rhombus with diagonals  $\overline{PR}$  and  $\overline{SQ}$ . If  $PQ = 3x + 8$  and  $QR = 2x + 17$ , find the value of  $x$ .



2. In the diagram below, PQRS is a rhombus with diagonals  $\overline{PR}$  and  $\overline{SQ}$ . If  $\angle SPQ = 8x - 14$  and  $m\angle 1 = 3x + 3$ , then find  $\angle SPQ$ .

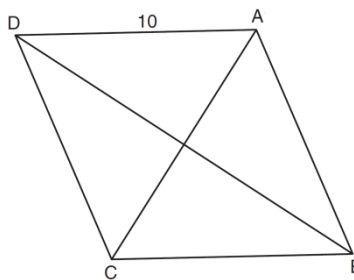


3. The diagonals of a rhombus have lengths of 12 centimeters and 16 centimeters. Find its perimeter.

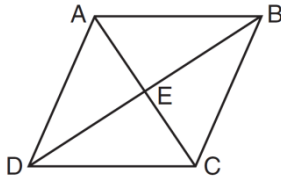
4. What is the length of the diagonal of a square whose side length is 12?

5. What is the perimeter of a square whose diagonal is  $3\sqrt{2}$ ?

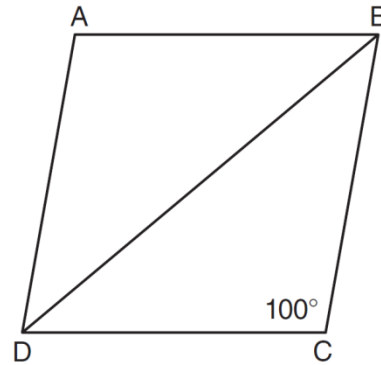
6. In rhombus  $ABCD$ , with diagonals  $\overline{AC}$  and  $\overline{DB}$ ,  $AD = 10$ . If the length of diagonal  $\overline{AC}$  is 12, what is the length of  $\overline{DB}$ ?



7. In the diagram below of rhombus  $ABCD$ , the diagonals  $\overline{AC}$  and  $\overline{BD}$  intersect at  $E$ . If  $AC = 18$  and  $BD = 24$ , what is the length of one side of rhombus  $ABCD$ ?



8. In the diagram below of rhombus  $ABCD$ ,  $m\angle C = 100$ . What is  $m\angle DBC$ ?



9. Which set of statements would describe a parallelogram that can always be classified as a rhombus?

- I. Diagonals are perpendicular bisectors of each other.
- II. Diagonals bisect the angles from which they are drawn.
- III. Diagonals form four congruent isosceles right triangles.

10. If  $ABCD$  is a parallelogram, which statement would prove that  $ABCD$  is a rhombus?

- 1)  $\angle ABC \cong \angle CDA$
- 2)  $\overline{AC} \cong \overline{BD}$
- 3)  $\overline{AC} \perp \overline{BD}$
- 4)  $\overline{AB} \perp \overline{CD}$

11. In parallelogram  $ABCD$ , diagonals  $\overline{AC}$  and  $\overline{BD}$  intersect at  $E$ . Which statement does *not* prove parallelogram  $ABCD$  is a rhombus?

- 1)  $\overline{AC} \cong \overline{DB}$
- 2)  $\overline{AB} \cong \overline{BC}$
- 3)  $\overline{AC} \perp \overline{DB}$
- 4)  $\overline{AC}$  bisects  $\angle DCB$

12. A quadrilateral whose diagonals bisect each other *and* are perpendicular is a

- 1) rhombus
- 2) rectangle
- 3) trapezoid
- 4) parallelogram

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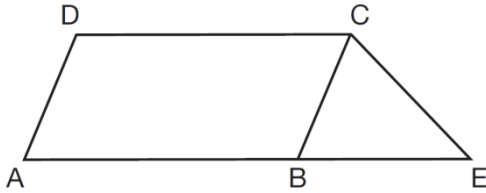
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**UNIT 7**

**LESSON 3**

**HOMEWORK**

1. In the diagram below,  $ABCD$  is a parallelogram,  $\overline{AB}$  is extended through  $B$  to  $E$ , and  $\overline{CE}$  is drawn.



If  $\overline{CE} \cong \overline{BE}$  and  $m\angle D = 112^\circ$ , what is  $m\angle E$ ?

- a)  $112^\circ$
- b)  $68^\circ$
- c)  $136^\circ$
- d)  $44^\circ$

2. A parallelogram is always a rectangle if

- 1) the diagonals are congruent
- 2) the diagonals bisect each other
- 3) the diagonals intersect at right angles
- 4) the opposite angles are congruent

3. Melissa is walking around the outside of a building that is in the shape of a regular polygon. She determines that the measure of one exterior angle of the building is  $60^\circ$ . How many sides does the building have?

- 1) 6
- 2) 9
- 3) 3
- 4) 12
- 4.

4. The sum of the interior angles of a regular polygon is  $720^\circ$ . How many sides does the polygon have?

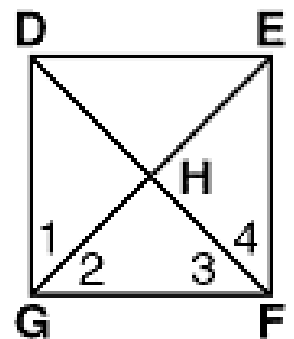
- 1) 8
- 2) 6
- 3) 5
- 4) 4

5. In the diagram below,  $DEFG$  is a **square** with diagonals  $\overline{GE}$  and  $\overline{DF}$ .

a) If  $DE = 5x - 14$  and  $EF = 3x - 6$ , find the value of  $x$ .

b) If  $DF = 2x - 17$  and  $GE = 28 - 3x$ , find the value of  $x$ .

c) What is the measure of angle 4?



6. What is the perimeter of a **rhombus** whose *diagonals* are 16 and 30? (*Hint: See Question 3 in notes!*)