

Name: _____

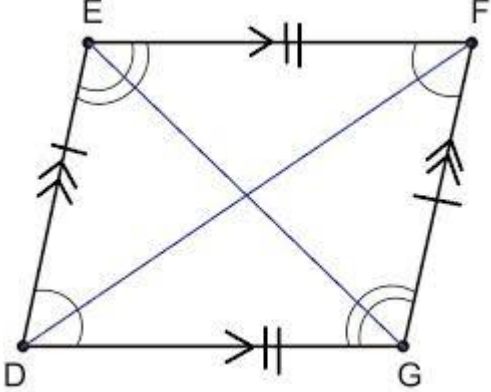
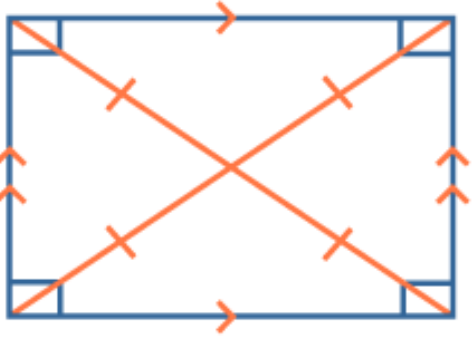
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UNIT 4

LESSON 2

AIM: APPLYING PROPERTIES OF PARALLELOGRAMS AND RECTANGLES

Do Now: $x^2 + 5x + 6 = 0$

| PARALLELOGRAMS | RECTANGLES |
|---|---|
|  <ul style="list-style-type: none"> • Opposite sides are PARALLEL. • Opposite sides are CONGRUENT. • Opposite angles are CONGRUENT. • Consecutive angles are SUPPLEMENTARY. • Diagonals BISECT each other. |  <p>ALL PROPERTIES OF PARALLELOGRAMS PLUS:</p> <ul style="list-style-type: none"> • Diagonals are CONGRUENT. • Angles are CONGRUENT (90 degree angles) |

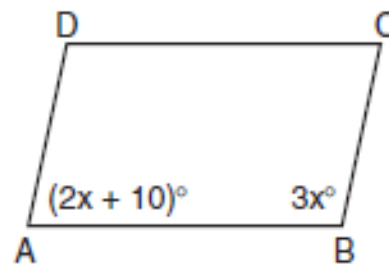
1. Which statement is *not* always true about a parallelogram?

- 1) The diagonals are congruent.
- 2) The opposite sides are congruent.
- 3) The opposite angles are congruent.
- 4) The opposite sides are parallel.

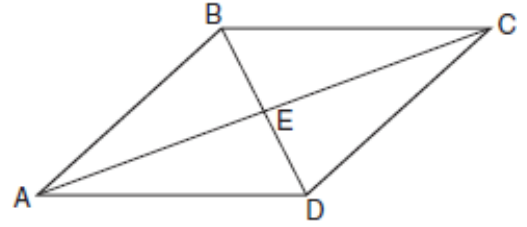
2. Which statement is true about every parallelogram?

- 1) All four sides are congruent.
- 2) The interior angles are all congruent.
- 3) Two pairs of opposite sides are congruent.
- 4) The diagonals are perpendicular to each other.

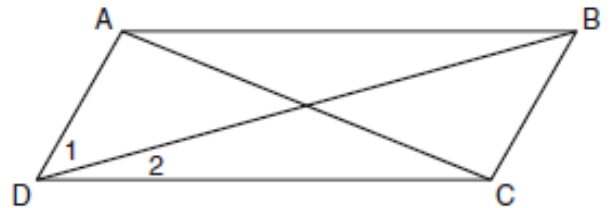
3. In the accompanying diagram of parallelogram $ABCD$, $m\angle A = (2x + 10)$ and $m\angle B = 3x$. Find the number of degrees in $m\angle B$.



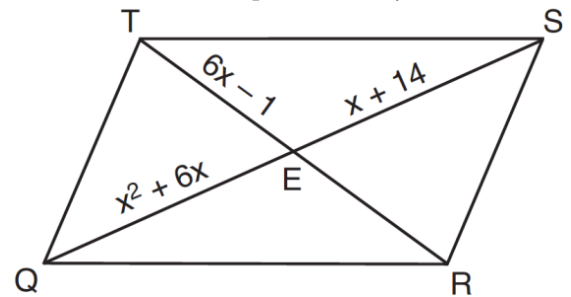
4. In the accompanying diagram of parallelogram $ABCD$, diagonals \overline{AC} and \overline{BD} intersect at E , $BE = \frac{2}{3}x$, and $ED = x - 10$. What is the value of x ?



5. In the diagram below of parallelogram $ABCD$ with diagonals \overline{AC} and \overline{BD} , $m\angle 1 = 45$ and $m\angle DCB = 120$. What is the measure of $\angle 2$?

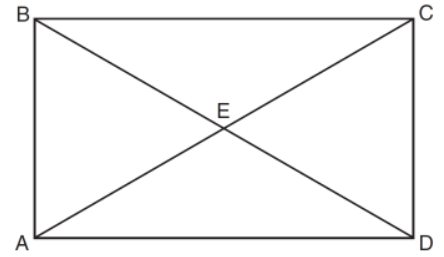


6. As shown in the diagram below, the diagonals of parallelogram $QRST$ intersect at E . If $QE = x^2 + 6x$, $SE = x + 14$, and $TE = 6x - 1$, determine TE algebraically

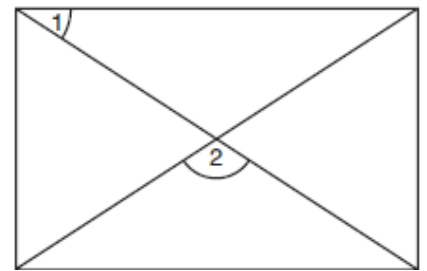


7. A builder is building a rectangular deck with dimensions of 16 feet by 30 feet. To ensure that the sides form 90° angles, what should each diagonal measure?

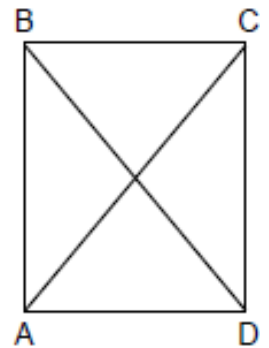
8. As shown in the diagram of rectangle $ABCD$ below, diagonals \overline{AC} and \overline{BD} intersect at E . If $AE = x + 2$ and $BD = 4x - 16$, then the length of \overline{AC} is



9. As shown in the accompanying diagram, a rectangular gate has two diagonal supports. If $m\angle 1 = 42$, what is $m\angle 2$?



10. In the accompanying diagram of rectangle $ABCD$, $m\angle BAC = 3x + 4$ and $m\angle ACD = x + 28$. What is $m\angle CAD$?

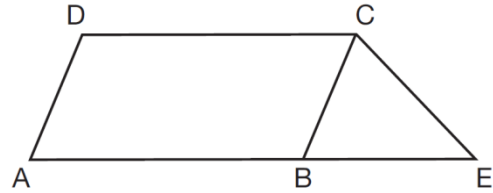


EXTRA PRACTICE

1. A parallelogram is always a rectangle if

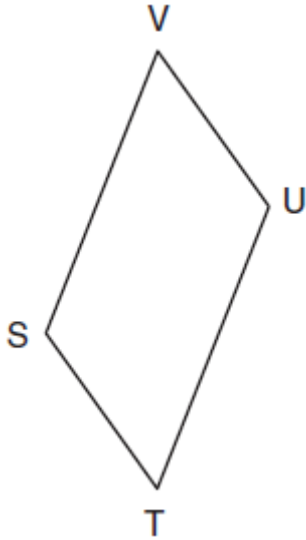
- 1) the diagonals are congruent
- 2) the diagonals bisect each other
- 3) the diagonals intersect at right angles
- 4) the opposite angles are congruent

2. 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 $m\angle E$?

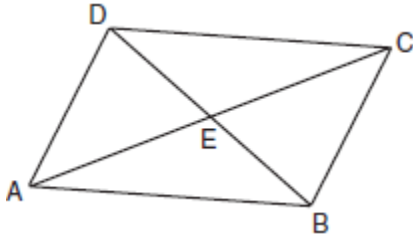
3. In the diagram below of parallelogram $STUV$, $SV = x + 3$, $VU = 2x - 1$, and $TU = 4x - 3$.



What is the length of \overline{SV} ?

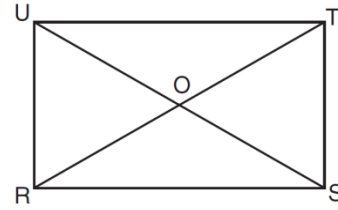
In parallelogram $RSTU$, $m\angle R = 5x - 2$ and $m\angle S = 3x + 10$. Determine and state the value of x .

5. In the accompanying diagram of parallelogram $ABCD$, diagonals \overline{AC} and \overline{DB} intersect at E , $AE = 3x - 4$, and $EC = x + 12$.



What is the value of x ?

- In the diagram below of rectangle $RSTU$, diagonals \overline{RT} and \overline{SU} intersect at O .



- If $RT = 6x + 4$ and $SO = 7x - 6$, what is the length of \overline{US} ?