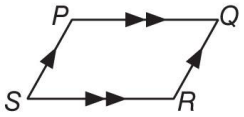
NAME _____ DATE _____ PERIOD _____

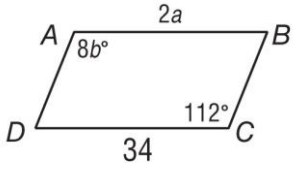
6-2 CLASSWORK

Sides and Angles of Parallelograms A quadrilateral with both pairs of opposite sides parallel is a **parallelogram**. Here are four important properties of parallelograms.



	If *PQRS* is a parallelogram, then
If a quadrilateral is a parallelogram, then its opposite sides are congruent.	$\overline{PQ} \cong \overline{SR}$ and $\overline{PS} \cong \overline{QR}$
If a quadrilateral is a parallelogram, then its opposite angles are congruent.	$\angle P \cong \angle R$ and $\angle S \cong \angle Q$
If a quadrilateral is a parallelogram, then its consecutive angles are supplementary.	$\angle P$ and $\angle S$ are supplementary; $\angle S$ and $\angle R$ are supplementary; $\angle R$ and $\angle Q$ are supplementary; $\angle Q$ and $\angle P$ are supplementary.
If a parallelogram has one right angle, then it has four right angles.	If $m\angle P = 90$, then $m\angle Q = 90$, $m\angle R = 90$, and $m\angle S = 90$.

Example: If *ABCD* is a parallelogram, find the value of each variable.



$\overline{AB}$ and $\overline{CD}$ are opposite sides, so $\overline{AB} \cong \overline{CD}$.

$2a = 34$

$a = 17$

$\angle A$ and $\angle C$ are opposite angles, so $\angle A \cong \angle C$.

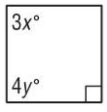
$8b = 112$

$b = 14$

Exercises

Find the value of each variable in the following parallelograms.

1.



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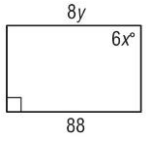

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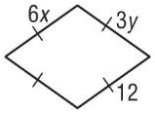

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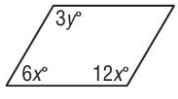

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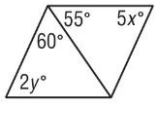

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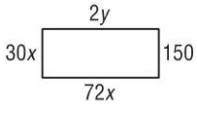
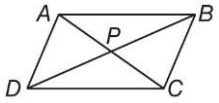


NAME _____ DATE _____ PERIOD _____

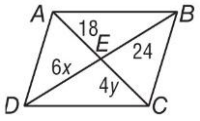
6-2 CLASSWORK

Diagonals of Parallelograms Two important properties of parallelograms deal with their diagonals.



	If *ABCD* is a parallelogram, then
If a quadrilateral is a parallelogram, then its diagonals bisect each other.	*AP = PC and DP = PB*
If a quadrilateral is a parallelogram, then each diagonal separates the parallelogram into two congruent triangles.	$\triangle ACD \cong \triangle CAB$ and $\triangle ADB \cong \triangle CBD$

Example: Find the value of *x* and *y* in parallelogram *ABCD*.



The diagonals bisect each other, so *AE* = *CE* and *DE* = *BE*.

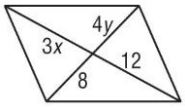
$6x = 24$ $4y = 18$

$x = 4$ $y = 4.5$

Exercises

Find the value of each variable in the following parallelograms.

1.



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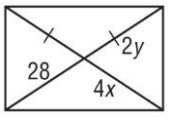

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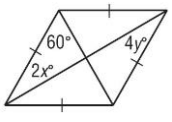

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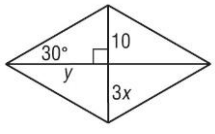
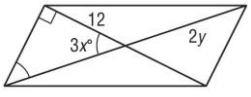
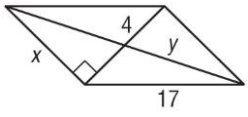


5.



6.



COORDINATE GEOMETRY Find the coordinates of the intersection of the diagonals of $\square ABCD$ with the given vertices.

7. *A*(3, 6), *B*(5, 8), *C*(3, –2), and *D*(1, –4)

8. *A*(–4, 3), *B*(2, 3), *C*(–1, –2), and *D*(–7, –2)