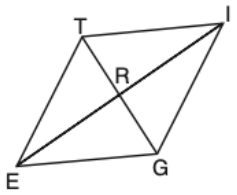
R.4 Rhombus

1. Rhombus diagonal length

In rhombus *TIGE*, diagonals $\overline{TG}$ and $\overline{IE}$ intersect at *R*. The perimeter of *TIGE* is 68, and $TG = 16$.

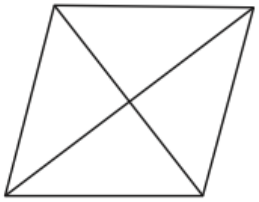


What is the length of diagonal $\overline{IE}$?

(1) 15
(2) 30
(3) 34
(4) 52

2. Rhombus transformations "onto"

The figure below shows a rhombus with noncongruent diagonals.



Which transformation would *not* carry this rhombus onto itself?

(1) a reflection over the shorter diagonal
(2) a reflection over the longer diagonal
(3) a clockwise rotation of 90° about the intersection of the diagonals
(4) a counterclockwise rotation of 180° about the intersection of the diagonals

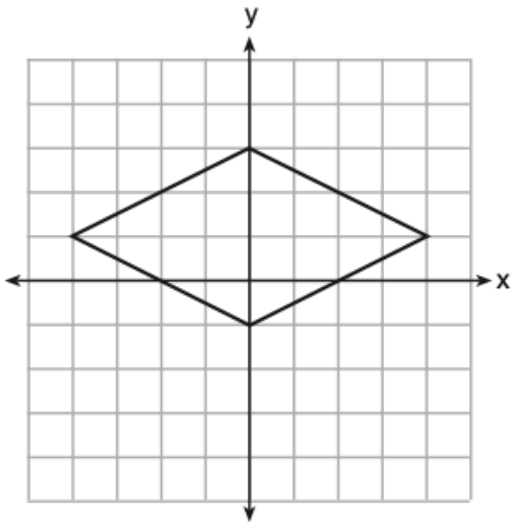
3. Rhombus side length

Rhombus *STAR* has vertices *S*(–1,2), *T*(2,3), *A*(3,0), and *R*(0,–1). What is the perimeter of rhombus *STAR*?

(1) $\sqrt{34}$
(2) $4\sqrt{34}$
(3) $\sqrt{10}$
(4) $4\sqrt{10}$

4. Rhombus reflection

A rhombus is graphed on the set of axes below.



Which transformation would carry the rhombus onto itself?

(1) 180° rotation counterclockwise about the origin

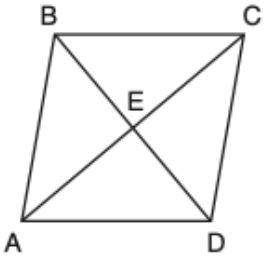
(2) reflection over the line $y = \frac{1}{2}x + 1$

(3) reflection over the line $y = 0$

(4) reflection over the line $x = 0$

5. Rhombus properties (perpendicular diagonals)

The diagram below shows parallelogram $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at E.



What additional information is sufficient to prove that parallelogram $ABCD$ is also a rhombus?

(1) $\overline{BD}$ bisects $\overline{AC}$.

(2) $\overline{AB}$ is parallel to $\overline{CD}$.

(3) $\overline{AC}$ is congruent to $\overline{BD}$.

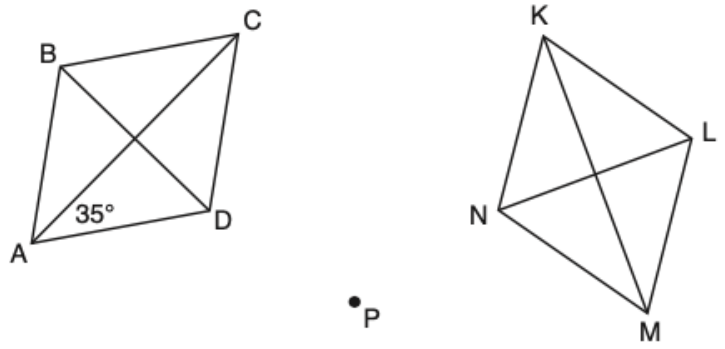
(4) $\overline{AC}$ is perpendicular to $\overline{BD}$.

6. A parallelogram must be a rhombus if its diagonals

   (a) are congruent
   (b) bisect each other
   (c) do not bisect its angles
   (d) are perpendicular to each other

7. Rhombus angle calculation

   Rhombus *ABCD* can be mapped onto rhombus *KLMN* by a rotation about point *P*, as shown below.



   What is the measure of $\angle KNM$ if the measure of $\angle CAD = 35°$?

   (1) 35° (3) 70°
   (2) 55° (4) 110°

8. In rhombus $VENU$, diagonals $\overline{VN}$ and $\overline{EU}$ intersect at S. If $VN = 12$ and $EU = 16$, what is the perimeter of the rhombus?

9. Rhombus properties

   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.

   (1) I and II (3) II and III
   (2) I and III (4) I, II, and III

10. Which statement about parallelograms is always true?

    (a) The diagonals are congruent.

    (b) The diagonals bisect each other.

    (c) The diagonals are perpendicular.

    (d) The diagonals bisect their respective angles.

11. Rhombus properties

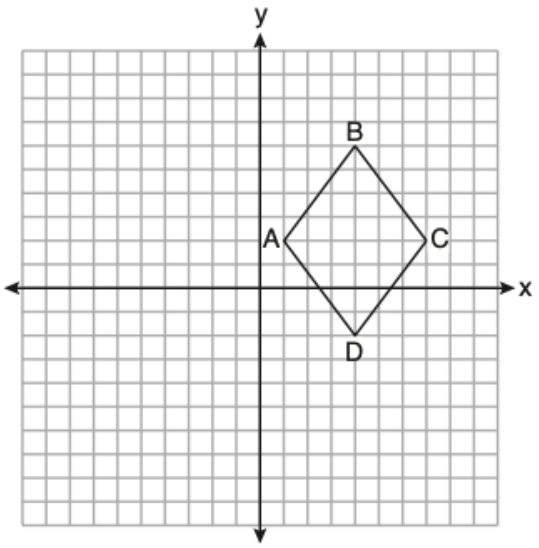
    If $ABCD$ is a parallelogram, which statement would prove that $ABCD$ is a rhombus?

    (1) $\angle ABC \cong \angle CDA$ (3) $\overline{AC} \perp \overline{BD}$

    (2) $\overline{AC} \cong \overline{BD}$ (4) $\overline{AB} \perp \overline{CD}$

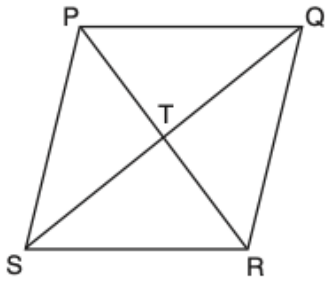
12. Rhombus area

    On the set of axes below, rhombus $ABCD$ has vertices whose coordinates are $A(1,2)$, $B(4,6)$, $C(7,2)$, and $D(4,-2)$.



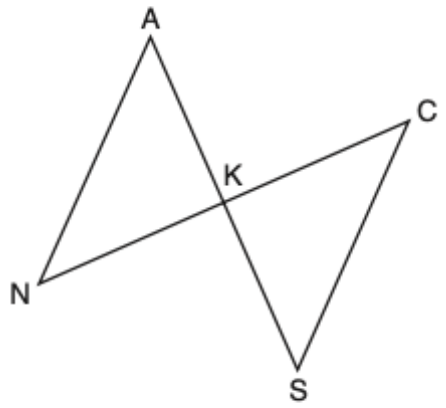
    What is the area of rhombus $ABCD$?

    In the diagram of rhombus $PQRS$ below, the diagonals $\overline{PR}$ and $\overline{QS}$ intersect at point T, $PR = 16$, and $QS = 30$. Determine and state the perimeter of $PQRS$.



13. Angle-angle-side sufficiency situation

In the diagram below, $\overline{AKS}$, $\overline{NKC}$, $\overline{AN}$, and $\overline{SC}$ are drawn such that $\overline{AN} \cong \overline{SC}$.



Which additional statement is sufficient to prove $\triangle KAN \cong \triangle KSC$ by AAS?

(1) $\overline{AS}$ and $\overline{NC}$ bisect each other.

(2) K is the midpoint of $\overline{NC}$.

(3) $\overline{AS} \perp \overline{CN}$

(4) $\overline{AN} \parallel \overline{SC}$