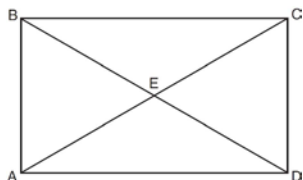


G.G.39: Special Parallelograms 1: Investigate, justify, and apply theorems about special parallelograms (rectangles, rhombuses, squares) involving their angles, sides, diagonals

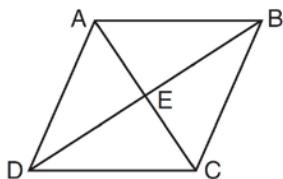
- 1 Which quadrilateral has diagonals that always bisect its angles and also bisect each other?
 - 1) rhombus
 - 2) rectangle
 - 3) parallelogram
 - 4) isosceles trapezoid
- 2 The diagonals of a quadrilateral are congruent but do not bisect each other. This quadrilateral is
 - 1) an isosceles trapezoid
 - 2) a parallelogram
 - 3) a rectangle
 - 4) a rhombus
- 3 Which quadrilateral does *not* always have congruent diagonals?
 - 1) isosceles trapezoid
 - 2) rectangle
 - 3) rhombus
 - 4) square
- 4 In quadrilateral $ABCD$, the diagonals bisect its angles. If the diagonals are *not* congruent, quadrilateral $ABCD$ must be a
 - 1) square
 - 2) rectangle
 - 3) rhombus
 - 4) trapezoid
- 5 Given three distinct quadrilaterals, a square, a rectangle, and a rhombus, which quadrilaterals must have perpendicular diagonals?
 - 1) the rhombus, only
 - 2) the rectangle and the square
 - 3) the rhombus and the square
 - 4) the rectangle, the rhombus, and the square
- 6 Which reason could be used to prove that a parallelogram is a rhombus?
 - 1) Diagonals are congruent.
 - 2) Opposite sides are parallel.
 - 3) Diagonals are perpendicular.
 - 4) Opposite angles are congruent.
- 7 In quadrilateral $ABCD$, each diagonal bisects opposite angles. If $m\angle DAB = 70$, then $ABCD$ must be a
 - 1) rectangle
 - 2) trapezoid
 - 3) rhombus
 - 4) square
- 8 What is the perimeter of a square whose diagonal is $3\sqrt{2}$?
 - 1) 18
 - 2) 12
 - 3) 9
 - 4) 6

- 9 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

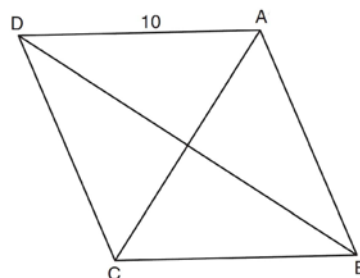
- 1) 6
 - 2) 10
 - 3) 12
 - 4) 24
- 10 In the diagram below of rhombus $ABCD$, the diagonals \overline{AC} and \overline{BD} intersect at E .



If $AC = 18$ and $BD = 24$, what is the length of one side of rhombus $ABCD$?

- 1) 15
- 2) 18
- 3) 24
- 4) 30

- 11 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} ?

- 1) 8
- 2) 16
- 3) $\sqrt{44}$
- 4) $\sqrt{136}$

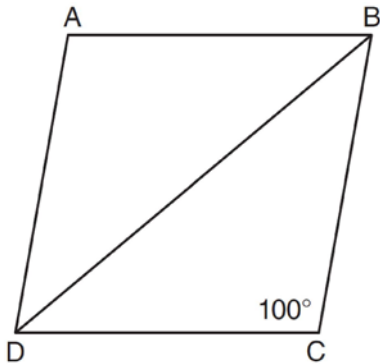
- 12 In rhombus $ABCD$, the diagonals \overline{AC} and \overline{BD} intersect at E . If $AE = 5$ and $BE = 12$, what is the length of \overline{AB} ?

- 1) 7
- 2) 10
- 3) 13
- 4) 17

- 13 What is the perimeter of a rhombus whose diagonals are 16 and 30?

- 1) 92
- 2) 68
- 3) 60
- 4) 17

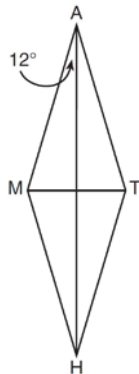
- 14 In the diagram below of rhombus $ABCD$, $m\angle C = 100^\circ$.



What is $m\angle DBC$?

- 1) 40
- 2) 45
- 3) 50
- 4) 80

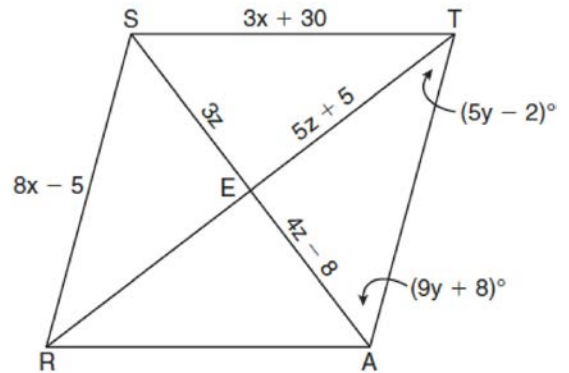
- 15 In the diagram below, $MATH$ is a rhombus with diagonals \overline{AH} and \overline{MT} .



If $m\angle HAM = 12$, what is $m\angle AMT$?

- 1) 12
- 2) 78
- 3) 84
- 4) 156

- 16 In the diagram below, quadrilateral $STAR$ is a rhombus with diagonals \overline{SA} and \overline{TR} intersecting at E . $ST = 3x + 30$, $SR = 8x - 5$, $SE = 3z$, $TE = 5z + 5$, $AE = 4z - 8$, $m\angle RTA = 5y - 2$, and $m\angle TAS = 9y + 8$. Find SR , RT , and $m\angle TAS$.



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Answer Section

- 1 ANS: 1 REF: 061125ge
 2 ANS: 1 REF: 081121ge
 3 ANS: 3 REF: 011425ge
 4 ANS: 3 REF: 081419ge
 5 ANS: 3 REF: 081128ge
 6 ANS: 3 REF: 061228ge
 7 ANS: 3

Diagonals of rectangles and trapezoids do not bisect opposite angles. $m\angle DAB = 90$ if $ABCD$ is a square.

REF: 061511ge

- 8 ANS: 2

$$s^2 + s^2 = (3\sqrt{2})^2$$

$$2s^2 = 18$$

$$s^2 = 9$$

$$s = 3$$

REF: 011420ge

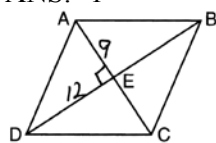
- 9 ANS: 4

$$2x - 8 = x + 2. \quad AE = 10 + 2 = 12. \quad AC = 2(AE) = 2(12) = 24$$

$$x = 10$$

REF: 011327ge

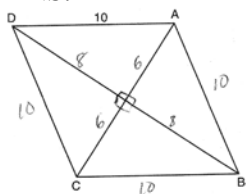
- 10 ANS: 1



$$\sqrt{9^2 + 12^2} = 15$$

REF: 011505ge

- 11 ANS: 2



REF: 061414ge

12 ANS: 3

$$\sqrt{5^2 + 12^2} = 13$$

REF: 061116ge

13 ANS: 2

$$\sqrt{8^2 + 15^2} = 17$$

REF: 061326ge

14 ANS: 1

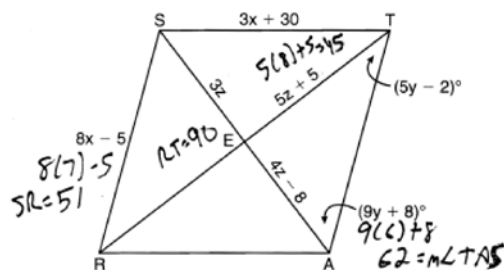
REF: 011112ge

15 ANS: 2

The diagonals of a rhombus are perpendicular. $180 - (90 + 12) = 78$

REF: 011204ge

16 ANS:



$$8x - 5 = 3x + 30. \quad 4z - 8 = 3z. \quad 9y + 8 + 5y - 2 = 90.$$

$$5x = 35$$

$$z = 8$$

$$14y + 6 = 90$$

$$x = 7$$

$$14y = 84$$

$$y = 6$$

REF: 061038ge