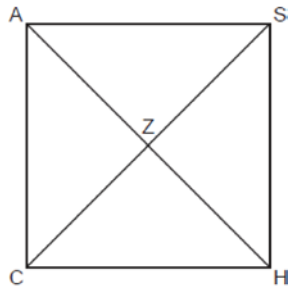
G.CO.C.11: Special Quadrilaterals 1

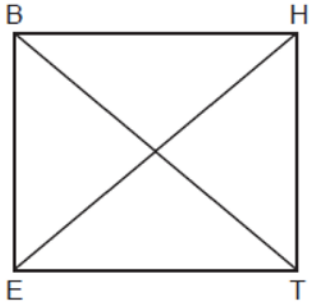
1 In the diagram below of square *CASH*, diagonals $\overline{AH}$ and $\overline{CS}$ intersect at *Z*.



Which statement is true?
1) $m\angle ACZ > m\angle ZCH$
2) $m\angle ACZ < m\angle ASZ$
3) $m\angle AZC = m\angle SHC$
4) $m\angle AZC = m\angle ZCH$

2 Which information is *not* sufficient to prove that a parallelogram is a square?
1) The diagonals are both congruent and perpendicular.
2) The diagonals are congruent and one pair of adjacent sides are congruent.
3) The diagonals are perpendicular and one pair of adjacent sides are congruent.
4) The diagonals are perpendicular and one pair of adjacent sides are perpendicular.

3 Parallelogram *BETH*, with diagonals $\overline{BT}$ and $\overline{HE}$, is drawn below.



What additional information is sufficient to prove that *BETH* is a rectangle?
1) $\overline{BT} \perp \overline{HE}$
2) $\overline{BE} \parallel \overline{HT}$
3) $\overline{BT} \cong \overline{HE}$
4) $\overline{BE} \cong \overline{ET}$

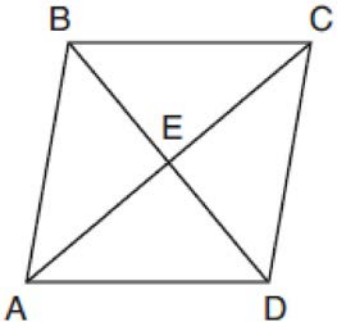
4 If *ABCD* is a parallelogram, which additional information is sufficient to prove that *ABCD* is a rectangle?
1) $\overline{AB} \cong \overline{BC}$
2) $\overline{AB} \parallel \overline{CD}$
3) $\overline{AC} \cong \overline{BD}$
4) $\overline{AC} \perp \overline{BD}$

5 In parallelogram *ABCD*, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*. Which statement proves *ABCD* is a rectangle?
1) $\overline{AC} \cong \overline{BD}$
2) $\overline{AB} \perp \overline{BD}$
3) $\overline{AC} \perp \overline{BD}$
4) $\overline{AC}$ bisects $\angle BCD$

6 A parallelogram must be a rectangle when its
1) diagonals are perpendicular
2) diagonals are congruent
3) opposite sides are parallel
4) opposite sides are congruent

7 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

8 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 $\overline{BD}$.

9 Parallelogram $EATK$ has diagonals $\overline{ET}$ and $\overline{AK}$. Which information is always sufficient to prove $EATK$ is a rhombus?
1) $\overline{EA} \perp \overline{AT}$
2) $\overline{EA} \cong \overline{AT}$
3) $\overline{ET} \cong \overline{AK}$
4) $\overline{ET} \cong \overline{AT}$

10 Which congruence statement is sufficient to prove parallelogram $MARK$ is a rhombus?
1) $\overline{MA} \cong \overline{MK}$
2) $\overline{MA} \cong \overline{KR}$
3) $\angle K \cong \angle A$
4) $\angle R \cong \angle A$

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 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) $\overline{AB} \perp \overline{CD}$

13 A parallelogram must be a rhombus if its diagonals
1) are congruent
2) bisect each other
3) do not bisect its angles
4) are perpendicular to each other

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

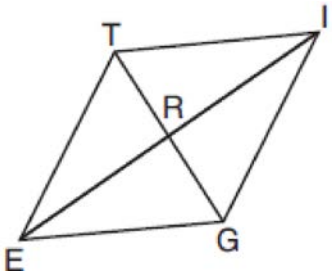
I. Diagonals are perpendicular bisectors of each other.

II. Diagonals bisect the angles from which they are drawn.

III. Diagonals form four congruent isosceles right triangles.

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

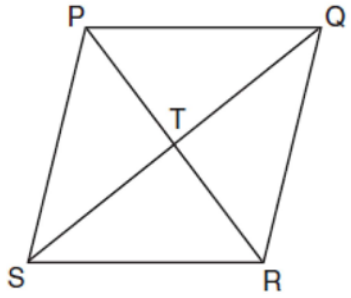
15 In rhombus *TIGE*, diagonals $\overline{TG}$ and $\overline{IE}$ intersect at *R*. The perimeter of *TIGE* is 68, and *TG* = 16.



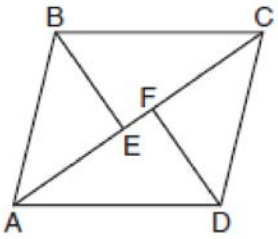
What is the length of diagonal $\overline{IE}$?
1) 15
2) 30
3) 34
4) 52

16 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?
1) 80
2) 40
3) 20
4) 10

17 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*.



18 In the diagram below, if $\triangle ABE \cong \triangle CDF$ and $\overline{AEFC}$ is drawn, then it could be proven that quadrilateral *ABCD* is a



1) square
2) rhombus
3) rectangle
4) parallelogram

19 A quadrilateral has diagonals that are perpendicular but *not* congruent. This quadrilateral could be
1) a square
2) a rhombus
3) a rectangle
4) an isosceles trapezoid

20 Which polygon does *not* always have congruent diagonals?
1) square
2) rectangle
3) rhombus
4) isosceles trapezoid

21 Which quadrilateral has diagonals that are always perpendicular?
1) rectangle
2) rhombus
3) trapezoid
4) parallelogram

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Answer Section

1 ANS: 3 REF: 012413geo
2 ANS: 3 REF: 061924geo
3 ANS: 3 REF: 062310geo
4 ANS: 3 REF: 062417geo
5 ANS: 1 REF: 012004geo
6 ANS: 2 REF: 081501geo
7 ANS: 1 REF: 011716geo
8 ANS: 4 REF: 061813geo
9 ANS: 2 REF: 012420geo
10 ANS: 1 REF: 062423geo
11 ANS: 1
1) opposite sides; 2) adjacent sides; 3) perpendicular diagonals; 4) diagonal bisects angle

REF: 061609geo
12 ANS: 3
In (1) and (2), *ABCD* could be a rectangle with non-congruent sides. (4) is not possible

REF: 081714geo
13 ANS: 4 REF: 011819geo
14 ANS: 4 REF: 061711geo
15 ANS: 2
$ER = \sqrt{17^2 - 8^2} = 15$

REF: 061917geo
16 ANS: 2
$\sqrt{8^2 + 6^2} = 10$ for one side

REF: 011907geo
17 ANS:
The four small triangles are 8-15-17 triangles. $4 \times 17 = 68$

REF: 081726geo
18 ANS: 4 REF: 011705geo
19 ANS: 2 REF: 082204geo
20 ANS: 3 REF: 012309geo
21 ANS: 2 REF: 082305geo