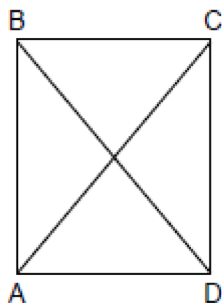


G.G.39: Special Parallelograms 2: Investigate, justify, and apply theorems about special parallelograms (rectangles, rhombuses, squares) involving their angles, sides, diagonals

- 1 Which statement is *false*?
- 1) All parallelograms are quadrilaterals.
 - 2) All rectangles are parallelograms.
 - 3) All squares are rhombuses.
 - 4) All rectangles are squares.

- 2 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?
- 1) 16 ft
 - 2) 30 ft
 - 3) 34 ft
 - 4) 46 ft

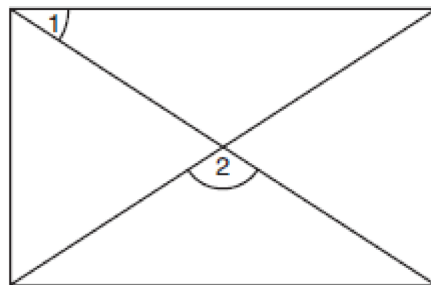
- 3 In the accompanying diagram of rectangle $ABCD$, $m\angle BAC = 3x + 4$ and $m\angle ACD = x + 28$.



What is $m\angle CAD$?

- 1) 12
 - 2) 37
 - 3) 40
 - 4) 50
- 4 In rectangle $ABCD$, $AC = 3x + 15$ and $BD = 4x - 5$. Find the length of \overline{AC} .

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



- 6 The lengths of the sides of two similar rectangular billboards are in the ratio 5:4. If 250 square feet of material is needed to cover the larger billboard, how much material, in square feet, is needed to cover the smaller billboard?
- 7 Al says, "If $ABCD$ is a parallelogram, then $ABCD$ is a rectangle." Sketch a quadrilateral $ABCD$ that shows that Al's statement is *not* always true. Your sketch must show the length of each side and the measure of each angle for the quadrilateral you draw.
- 8 The perimeter of a square is 56. Express the length of a diagonal of the square in simplest radical form.
- 9 In rhombus $ABCD$, the measure, in inches, of \overline{AB} is $3x + 2$ and \overline{BC} is $x + 12$. Find the number of inches in the length of \overline{DC} .

G.G.39: Special Parallelograms 2: Investigate, justify, and apply theorems about special parallelograms (rectangles, rhombuses, squares) involving their angles, sides, diagonals
Answer Section

1 ANS: 4

Not all rectangles are squares.

REF: 010919a

2 ANS: 3

$$16^2 + 30^2 = c^2$$

$1156 = c^2$. 16, 30, 34 is a multiple of the 8, 15, 17 triangle.

$$34 = c$$

REF: 010615a

3 ANS: 4

Because $ABCD$ is a rectangle, \overline{AB} and \overline{CD} are parallel and \overline{AC} is a transversal. $\angle BAC$ and $\angle ACD$ are equal alternate interior angles. $3x + 4 = x + 28$. $m\angle BAC = 3(12) + 4 = 40$. Since $\angle BAC$ and $\angle CAD$ are complementary, $m\angle CAD = 50$.

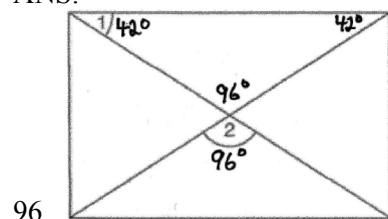
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4 ANS:

75. The diagonals of a parallelogram are congruent. $3x + 15 = 4x - 5$. $AC = 3(20) + 15 = 75$.

REF: 010533a

5 ANS:



REF: 010835a

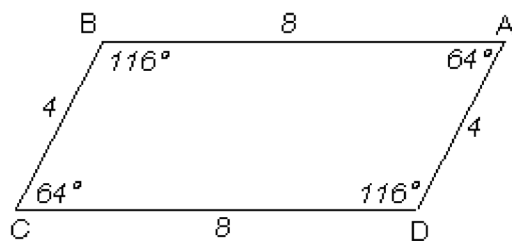
6 ANS:

160. Both the length and width of the smaller rectangle are $\frac{4}{5}$ that of the larger.

$$A = \frac{4}{5}l \times \frac{4}{5}w = \frac{16}{25}lw = \frac{16}{25} \times 250 = 160.$$

REF: 060322a

7 ANS:



REF: 010025a

8 ANS:

$14\sqrt{2}$. The length of each side of the square is $\frac{56}{4} = 14$. $c = \sqrt{14^2 + 14^2} = \sqrt{2 \times 14^2} = 14\sqrt{2}$

REF: 010736a

9 ANS:

17. A rhombus has four congruent sides. $\begin{array}{l} 3x + 2 = x + 12 \\ x = 5 \end{array}$. $(5) + 12 = 17$.

REF: 080735a