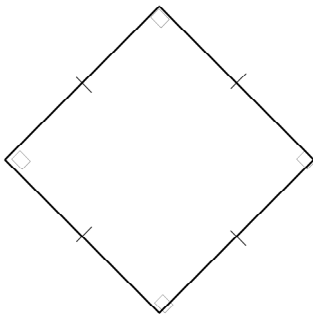## Special Quadrilaterals

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. Which description does NOT guarantee that a quadrilateral is a square?
   a.   is both a rectangle and a rhombus
   b.   is a parallelogram with perpendicular diagonals
   c.   has all sides congruent and all angles congruent
   d.   has all right angles and has all sides congruent

_____ 2. Classify the figure in as many ways as possible.

   a.   rectangle, square, quadrilateral, parallelogram, rhombus
   b.   rectangle, square, parallelogram
   c.   rhombus, quadrilateral, square
   d.   square, rectangle, quadrilateral

_____ 3. Which statement is true?
   a.   All quadrilaterals are rectangles.
   b.   All quadrilaterals are squares.
   c.   All rectangles are quadrilaterals.
   d.   All quadrilaterals are parallelograms.
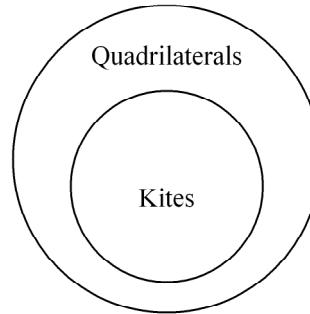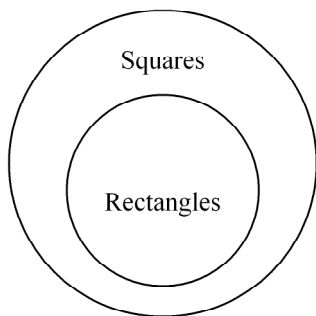
____   4.   Which Venn diagram is NOT correct?

     a.

Rhombuses

Squares

     c.

Quadrilaterals

Kites

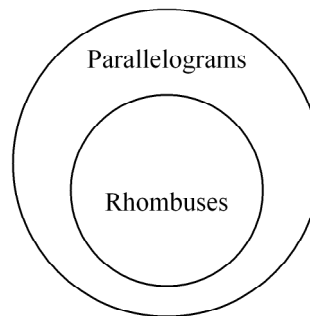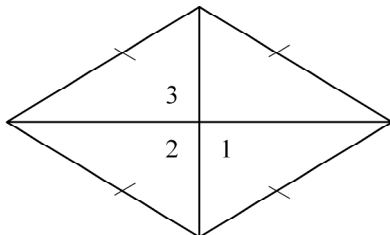   b.

Squares

Rectangles

     d.

Parallelograms
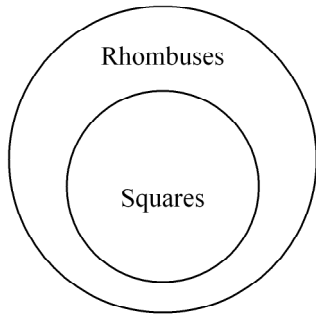
Rhombuses

____   5.   In the rhombus, $m\angle 1 = 18x$, $m\angle 2 = x + y$, and $m\angle 3 = 30z$. Find the value of each variable. The diagram is not to scale.
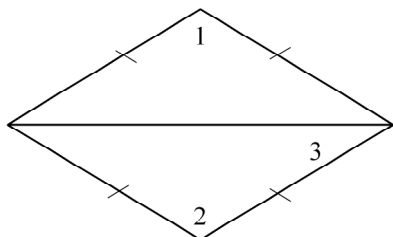
3

2   1

     a. $x = 10$, $y = 85$, $z = 6$ c. $x = 5$, $y = 85$, $z = 3$

     b. $x = 5$, $y = 175$, $z = 6$ d. $x = 10$, $y = 175$, $z = 3$
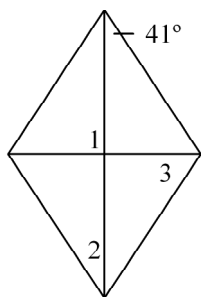
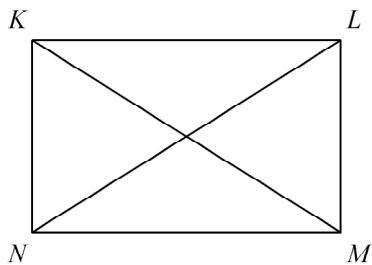_____ 6. In the rhombus, $m\angle 1 = 106$. What are $m\angle 2$ and $m\angle 3$? The diagram is not to scale.

     a. $m\angle 2 = 106, \ m\angle 3 = 53$ c. $m\angle 2 = 106, \ m\angle 3 = 37$
     b. $m\angle 2 = 74, \ m\angle 3 = 37$ d. $m\angle 2 = 74, \ m\angle 3 = 53$

_____ 7. Find the measure of the numbered angles in the rhombus. The diagram is not to scale.
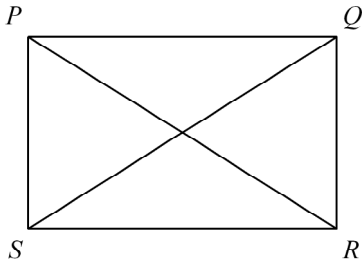

     a. $m\angle 1 = 90, m\angle 2 = 41,$ and $m\angle 3 = 41$ c. $m\angle 1 = 90, m\angle 2 = 49,$ and $m\angle 3 = 41$
     b. $m\angle 1 = 90, m\angle 2 = 41,$ and $m\angle 3 = 69.5$ d. $m\angle 1 = 90, m\angle 2 = 41,$ and $m\angle 3 = 49$

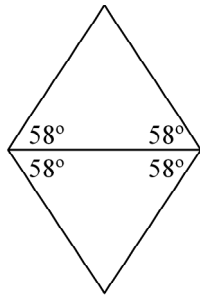_____ 8. In rectangle $KLMN$, $KM = 6x + 16$ and $LN = 49$. Find the value of x.

     a. 5.5   c. 33
   b. 4.5   d. 6.5

_____   9. In rectangle *PQRS*, *PR* = 18*x* – 24 and *QS* = *x* + 146. Find the value of *x* and the length of each diagonal.

   a.   *x* = 10, *PR* = 156, *QS* = 156   c.   *x* = 5, *PR* = 151, *QS* = 151
   b.   *x* = 10, *PR* = 78, *QS* = 78   d.   *x* = 11, *PR* = 174, *QS* = 174

_____   10. Parallelogram *ABCD* has the angle measures shown. Can you conclude that it is a rhombus, a rectangle, or a square? Explain.


   a.   Parallelogram *ABCD* is a rhombus, because the diagonal bisects two angles.
   b.   Parallelogram *ABCD* is a square, because all four angles have the same measure.
   c.   Parallelogram *ABCD* is a rectangle, because the diagonal creates congruent angles.
   d.   There is not enough information.

_____   11. In quadrilateral *ABCD*, $m\angle ACD = 2x + 4$ and $m\angle ACB = 5x - 11$. For what value of *x* is *ABCD* a rhombus?
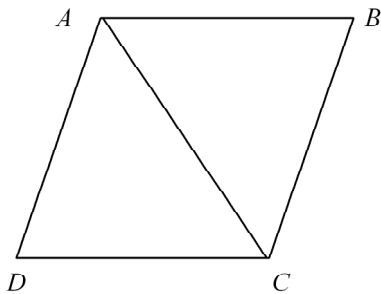
   a.   4   c.   6
   b.   5   d.   7

_____ 12. In quadrilateral $ABCD$, $AE = x + 10$ and $BE = 3x - 18$. For what value of x is $ABCD$ a rectangle?
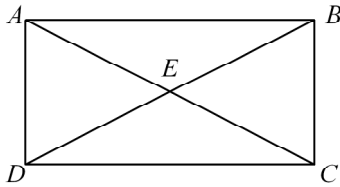
a. 24
b. 14

c. 18
d. 16

_____ 13. Lucinda wants to build a square sandbox, but she has no way of measuring angles. Explain how she can make sure that the sandbox is square by only measuring length.
a. Arrange four equal-length sides so the diagonals bisect each other.
b. Arrange four equal-length sides so the diagonals are equal lengths also.
c. Make each diagonal the same length as four equal-length sides.
d. Not possible; Lucinda has to be able to measure a right angle.

_____ 14. Find the values of a and b.The diagram is not to scale.
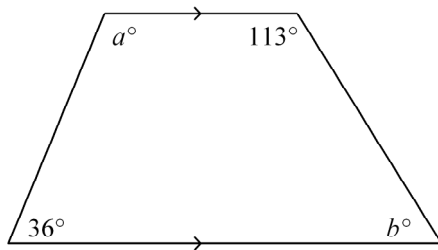
a. $a = 144, b = 67$
b. $a = 144, b = 36$

c. $a = 113, b = 67$
d. $a = 113, b = 36$

_____ 15. $\angle J$ and $\angle M$ are base angles of isosceles trapezoid $JKLM$. If $m\angle J = 20x + 9$, and $m\angle M = 14x + 15$, find $m\angle K$.
a. 151
b. 1
c. 29
d. 75.5

_____ 16. The isosceles trapezoid is part of an isosceles triangle with a 46° vertex angle. What is the measure of an acute base angle of the trapezoid? Of an obtuse base angle? The diagram is not to scale.
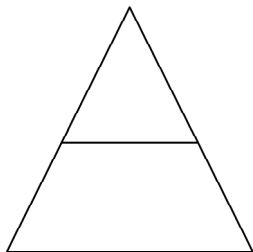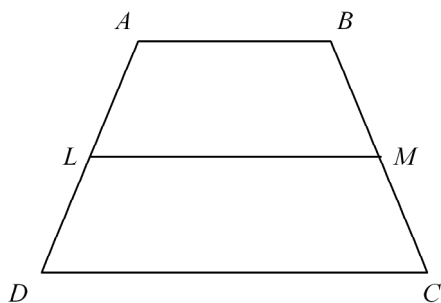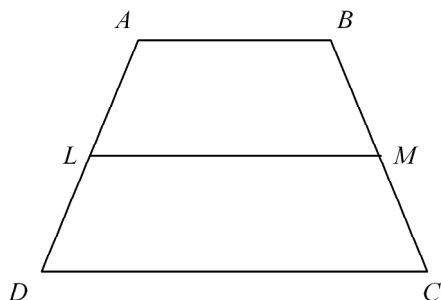

a. 67°; 134°
b. 67°; 113°
c. 46°; 134°
d. 46°; 113°

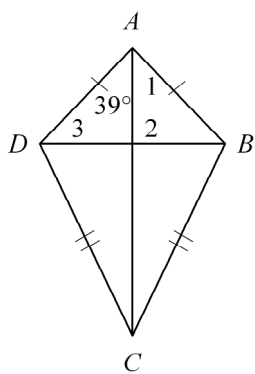____ 17. $\overline{LM}$ is the midsegment of $\square ABCD$. $AB = 46$ and $DC = 125$. What is LM?

a. 171 b. 85.5 c. 79 d. 95.5

____ 18. $\overline{LM}$ is the midsegment of $\square ABCD$. $AB = x + 8$, $LM = 4x + 3$, and $DC = 201$. What is the value of x?

a. 33 b. 29 c. 238 d. 37

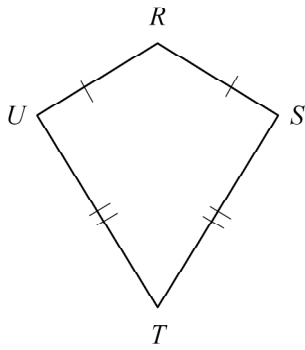____ 19. Find $m\angle 1$ and $m\angle 3$ in the kite. The diagram is not to scale.

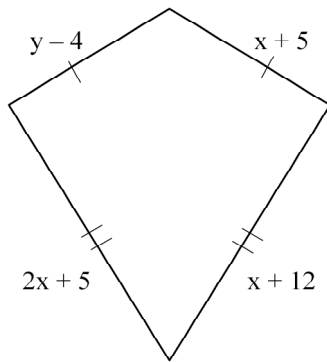a. 51, 51 b. 39, 39 c. 39, 51 d. 51, 39

_____ 20. $m\angle R = 130$ and $m\angle S = 80$. Find $m\angle T$. The diagram is not to scale.

a. 65   b. 70   c. 35   d. 80

_____ 21. Find the values of the variables and the lengths of the sides of this kite.

a. $x = 7, y = 16$; 3, 21   c. $x = 7, y = 16$; 12, 19
b. $x = 16, y = 7$; 12, 12   d. $x = 16, y = 7$; 3, 21

Special Quadrilaterals
Answer Section

MULTIPLE CHOICE

1. B
2. A
3. C
4. B
5. C
6. C
7. D
8. A
9. A
10. A
11. B
12. B
13. B
14. A
15. A
16. B
17. B
18. B
19. C
20. B
21. C