Review of Quadrilaterals
Warm-Up

In the diagram below of trapezoid $RSUT$, $RS \parallel TU$, $X$ is the midpoint of $RT$, and $V$ is the midpoint of $SU$.

If $RS = 30$ and $XV = 44$, what is the length of $TU$?

1) 37
2) 58
3) 74
4) 118
Find each measure.

1. \( m \angle T = 60^\circ \)

2. \( m \angle Y = 112^\circ \)

3. Trapezoid PQRS. Find the \( m \angle 1 \) and \( \angle 2 \).

4. ABCD is an isosceles trapezoid. Find the \( m \angle 1 \) and \( \angle 2 \).
5. MATH is an isosceles trapezoid with $\overline{AT} \parallel \overline{MH}$. If $\angle M = (3x - 9)^\circ$ and $\angle H = (x + 3)^\circ$, find the value of ‘$x$’.

\[
3x - 9 = x + 3
\]

\[
2x = 12
\]

\[
\boxed{x = 6}
\]

6. Let $AC = 25$ and $DB = 5x$.

\[
5x = 25
\]

\[
\boxed{x = 5}
\]
7. If \( EH = FG \), and \( m\angle E = 65^\circ \), then \( m\angle G = 115^\circ \) and \( m\angle GKJ = 65^\circ \).

8. \( KB = 12 \) and \( MF = 30 \). Find \( FB \).

\[
12 + x = 30 \\
x = 18 \\
FB = 18
\]

$$KM = JL$$
$$24 = KM$$

10. Find the value of $x$.

$$2m = b_1 + b_2$$
$$2(x+1) = (2x-7) + (x-3)$$
$$2x + 2 = 3x - 10$$
$$12 = x$$
11. The cross section of an attic is in the shape of an isosceles trapezoid, as shown in the accompanying figure. If the height of the attic is 9 feet, $BC = 12$ feet, and $AD = 28$ feet, find the length of $AB$ to the nearest foot.

\[ a^2 + b^2 = c^2 \]
\[ 8^2 + 9^2 = c^2 \]
\[ \sqrt{145} = c^2 \]
\[ 12.0 \approx c = AB \]
12. The accompanying diagram shows ramp $\overline{RA}$ leading to level platform $\overline{AM}$, forming an angle of $45^\circ$ with level ground. If platform $\overline{AM}$ measures 2 feet and is 6 feet above the ground. Find RA.
SWBAT: Review Quadrilateral Properties

HW ANSWERS

13. If PQ = 15, and SR = 9, find ST and PS.

\[ \frac{30}{60} \bigg| 90 \bigg| \frac{5}{\sqrt[3]{3}} \bigg| 25 \bigg| 6 \]

\[ \frac{2\sqrt{3}}{6} \frac{2(2\sqrt{3})}{4\sqrt{3}} \]

\[ S = 2\sqrt{3} \]

\[ S\sqrt{3} = 6 \]

\[ PS = 4\sqrt{3} \]

\[ ST = 2\sqrt{3} \]
Write the missing terms in the unlabeled sections.

Quadrilaterals

Parallelograms

Rectangles Square Rhombus

Trapezoids

Isos. Trap

Kite
SWBAT: Review Quadrilateral Properties

SUMMARY

PARALLELOGRAMS (rectangles, squares, and rhombi):

1) Opposite sides of a parallelogram are congruent.
2) Opposite angles of a parallelogram are congruent.
3) Consecutive angles in a parallelogram are supplementary.
4) The diagonals of a parallelogram bisect each other.

RECTANGLES:

1) Opposite sides are congruent (they equal each other).
2) Opposite angles are congruent (they equal each other).
3) Consecutive angles are supplementary (they add up to 180).
4) Diagonals bisect each other (the parts are equal).
5) Diagonals are congruent (they equal each other).
6) All four corner angles are 90°.
SWBAT: Review Quadrilateral Properties

**SQUARES:**

1) Opposite sides are congruent (they equal each other).
2) Opposite angles are congruent (they equal each other).
3) Consecutive angles are supplementary (they add up to 180).
4) Diagonals bisect each other (the parts are equal).
5) Diagonals are congruent (they equal each other).
6) All four corner angles are 90°.
7) Diagonals perpendicular (the form right angles in the middle).
8) Diagonals bisect angles (the angles equal to each other).

**RHOMBI:**

1) Opposite sides are congruent (they equal each other).
2) Opposite angles are congruent (they equal each other).
3) Consecutive angles are supplementary (they add up to 180).
4) Diagonals bisect each other (the parts are equal).
5) Diagonals perpendicular (the form right angles in the middle).
6) Diagonals bisect angles (the angles are equal to each other).
7) All four sides are congruent.
8) The diagonals are NOT congruent.
ISOSCELES TRAPEZOID:

Median = \( \frac{1}{2} (\text{base} + \text{base}) \)

\[ 2m = b_1 + b_2 \]

1) Lower two base angles are congruent (they equal each other).
2) Upper two base angles are congruent (they equal each other).
3) The diagonals are congruent (they equal each other).
4) Opposite angles are supplementary (they add up to 180).
SWBAT: Review Quadrilateral Properties

Part I: True/False

1. Opposite sides of a parallelogram are congruent.  
   T  F

2. The diagonals of a parallelogram bisect each other.  
   T  F

3. Diagonals of a parallelogram are congruent.  
   T  F

4. Consecutive sides of a parallelogram are congruent.  
   T  F

5. If a parallelogram has congruent diagonals, then it is a square.  
   T  F

6. Consecutive angles of a parallelogram are congruent.  
   T  F

7. A trapezoid is a parallelogram.  
   T  F

8. The diagonals of a rhombus are perpendicular to each other.  
   T  F

9. A rectangle is a square.  
   T  F

10. A square is a rectangle.  
    T  F
SWBAT: Review Quadrilateral Properties

11. The diagonals of a rectangle are congruent. T F

12. If the diagonals of a quadrilateral are perpendicular to each other, then the quadrilateral is a rhombus. T F

13. A parallelogram is a rhombus. T F

14. The diagonals of a rectangle bisect opposite angles. T F

15. A square is a rhombus. T F

16. A rectangle is equiangular. T F

17. The diagonals of a trapezoid are congruent. T F

18. The diagonals of a rhombus are perpendicular bisectors of each other. T F

19. A square is both a rectangle and a rhombus. T F

20. In a quadrilateral, if one pair of opposite sides are congruent and parallel, then it is a parallelogram. T F

21. Lower base angles and upper base angles are congruent in an isosceles trapezoid. T F
SWBAT: Review Quadrilateral Properties

22. Diagonals of an isosceles trapezoid bisect each other.  \(T\) \(F\)

23. Opposite angles of an isosceles trapezoid are supplementary. \(T\) \(F\)

Part II: Always, Sometimes, Never – Write A if the statement is always true, S for sometimes true, or N for never true.

24. If a parallelogram is equilateral, then it is equiangular. \(S\)

25. A quadrilateral is a parallelogram if each pair of consecutive angles is supplementary. \(A\)

A quadrilateral is a parallelogram if one pair of opposite sides is congruent and parallel.

A rhombus is a kite. \(A\)

A kite is a rhombus. \(A\)

29. An isosceles trapezoid is a parallelogram. \(N\)

The diagonals of a kite are perpendicular. \(A\)

31. If a quadrilateral has four right angles, then it is a rectangle. \(A\)

32. If a parallelogram has one right angle, then the other angles are right angles. \(A\)
Part III: Multiple Choice – Circle the most appropriate answer.

33. A quadrilateral that has congruent diagonals is a(n):
   a) square   b) rectangle   c) rhombus   d) isosceles trapezoid
   e) all of the above   f) a, b, and d are true   g) none of the above

34. The best name for a quadrilateral whose diagonals bisect each other, are perpendicular, congruent, is a
   a) rectangle   b) rhombus   c) square   d) parallelogram

35. Which of the following is not a property for a rhombus?
   a) All four sides are congruent.
   b) The diagonals are perpendicular.
   c) The diagonals bisect the opposite angles.
   d) The diagonals bisect each other.
   e) The diagonals are congruent.
36. Which of the following is true for an isosceles trapezoid?
   a) The opposite sides are congruent.  
   b) Opposite sides are parallel.  
   c) The diagonals bisect the opposite angles.  
   d) The diagonals bisect each other.  
   e) The diagonals are congruent.  

Which of the following is true for a kite?
   a) The opposite sides are congruent.  
   b) Opposite sides are parallel.  
   c) The diagonals bisect the opposite angles.  
   d) The diagonals bisect each other.  
   e) The diagonals are perpendicular.  
   f) The diagonals are congruent.  

38. Which of the following has both pairs of opposite angles supplementary?
   a) rectangle  
   b) square  
   c) isosceles trapezoid  
   d) kite  
   e) all of the above  
   f) both a and b  
   g) a, b, and c
39. Which of the following has all pairs of consecutive angles supplementary?
   a) rectangle  b) square  c) isosceles trapezoid  d) kite
   e) rhombus  f) parallelogram  g) all of the above
   h) All are true but d  i) a, b, e, and f are true

40. The most descriptive name for the figure at the right is a(n)
   a) square  b) rectangle  c) parallelogram
   d) kite  e) rhombus  f) isosceles trapezoid

41. The most descriptive name for the figure at the right is a(n)
   a) square  b) rectangle  c) parallelogram
   d) kite  e) rhombus  f) isosceles trapezoid

The most descriptive name for the figure at the right is a(n)
   a) square  b) rectangle  c) parallelogram
   d) kite  e) rhombus  f) isosceles trapezoid
SWBAT: Review Quadrilateral Properties

### SUMMARY CHARTS:

<table>
<thead>
<tr>
<th>Special Quadrilateral</th>
<th>Diagonals</th>
<th>Diagonals Bisect</th>
<th>Angles</th>
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<tbody>
<tr>
<td></td>
<td>Congruent</td>
<td>Perpendicular</td>
<td>Each Other</td>
</tr>
<tr>
<td>Parallelogram</td>
<td>Sometimes</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>Rectangle</td>
<td>Always</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>Rhombus</td>
<td>Sometimes</td>
<td>Always</td>
<td>Always</td>
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<td>Always</td>
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<tr>
<td>Trapezoid</td>
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<td>Never</td>
<td>Never</td>
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<tr>
<td>Isosceles Trapezoid</td>
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<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Kite</td>
<td>Never</td>
<td>Always</td>
<td>Only one diagonal</td>
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<table>
<thead>
<tr>
<th>Property</th>
<th>Rectangle</th>
<th>Rhombus</th>
<th>Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All the properties of a parallelogram?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. Equiangular (4 right corner angles?)</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>3. Equilateral (4 congruent sides?)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. Diagonals bisect angles?</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. Diagonals congruent?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>6. Diagonals perpendicular?</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
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