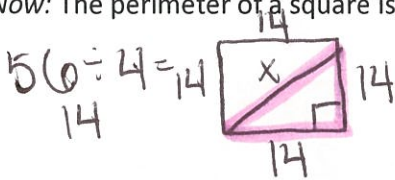


AIM: WHAT ARE THE PROPERTIES OF TRAPEZOIDS, ISOSCELES TRAPEZOIDS AND KITES?

Do Now: The perimeter of a square is 56. Express the length of a diagonal of the square to the nearest tenth.



$$14^2 + 14^2 = x^2$$

$$196 + 196 = x^2$$

$$\sqrt{392} = \sqrt{x^2}$$

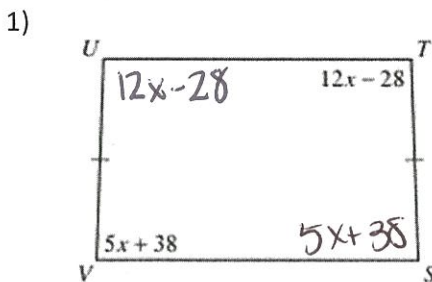
$$\sqrt{392}$$

$$\sqrt{2} \sqrt{196}$$

$$14\sqrt{2} = x$$

TRAPEZOID	ISOSCELES TRAPEZOID	KITE
<ul style="list-style-type: none"> Has ONE pair of opposite sides parallel. These sides are called the BASES. The sides that are not parallel are called the LEGS. The MIDSEGMENT is equal to $\frac{base_1 + base_2}{2}$ 	<p>ALL THE PROPERTIES OF A TRAPEZOID PLUS:</p> <ul style="list-style-type: none"> The legs are CONGRUENT. The base angles are CONGRUENT. The DIAGONALS are CONGRUENT. ADJACENT angles along the LEGS are SUPPLEMENTARY. 	<ul style="list-style-type: none"> Two pairs CONSECUTIVE sides are CONGRUENT. DIAGONALS are PERPENDICULAR. The longer diagonal (JL) BISECTS the shorter diagonal (KM). The longer diagonal BISECTS the opposite pair of angles (J and L) The opposite angles of the shorter diagonal are CONGRUENT (K and M).

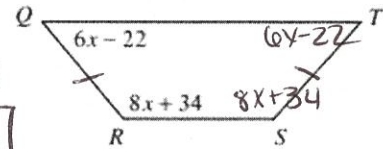
Given the isosceles trapezoids below, find the value of x and all of the angle measures.



2)

$$12(10) - 28 = \boxed{92^\circ = \angle U \text{ and } \angle T}$$

$$5(10) + 38 = \boxed{88^\circ = \angle V \text{ and } \angle S}$$



$$6x - 22 + 8x + 34 = 180$$

$$14x + 12 = 180$$

$$14x = 168$$

$$\boxed{x = 12}$$

$$5x + 38 + 12x - 28 = 180$$

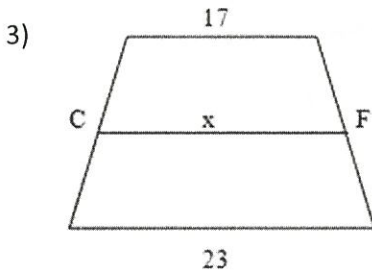
$$17x + 10 = 180$$

$$\begin{array}{r} -10 \quad -10 \\ \hline 17x = 170 \\ \boxed{x = 10} \end{array}$$

$$\angle Q = \angle T = 6(12) - 22 = 50^\circ$$

$$\angle R = \angle S = 8(12) + 34 = 130^\circ$$

Given the trapezoids with the corresponding midsegments below, find the value of x.

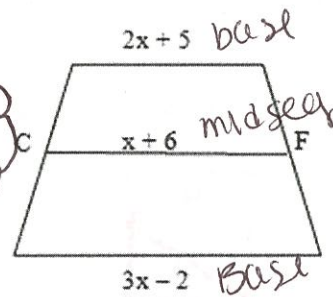


$$\frac{23+17}{2} = x$$

$$\frac{40}{2} = x$$

$$\boxed{20 = x}$$

4)
$$\frac{\text{Base} + \text{Base}}{2} = \text{midseg}$$



$$\frac{2x+5 + 3x-2}{2} = \frac{x+6}{1}$$

$$\frac{5x+3}{2} = \frac{x+6}{1}$$

$$2(x+6) = 5x+3$$

$$2x+12 = 5x+3$$

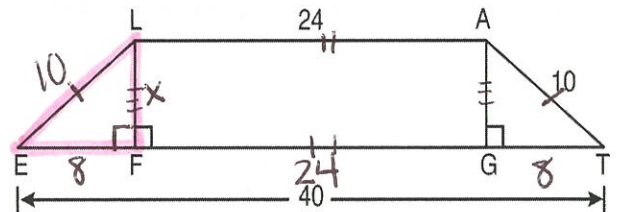
$$\begin{array}{r} 2x+12 = 5x+3 \\ -2x-3 \quad -2x-3 \\ \hline 9 = 3x \\ \boxed{x=3} \end{array}$$

5) In the diagram below, LATE is an isosceles trapezoid with $\overline{LE} \cong \overline{AT}$, $\overline{LA} = 24$, $\overline{ET} = 40$, and $\overline{AT} = 10$. Altitudes \overline{LF} and \overline{AG} are drawn. What is the length of \overline{LF} ? Explain your solution.

$$\begin{array}{r} x^2 + 8^2 = 10^2 \\ x^2 + 64 = 100 \\ -64 \quad -64 \\ \hline x^2 = 36 \\ x = 6 \end{array}$$

$$x = 6$$

$$\boxed{\overline{LF} = 6}$$



$$40 - 24 = 16 \div 2 = 8$$

MIXED PRACTICE!

(Complete for HW before QUIZ TOMORROW!)

List the 5 Properties of **PARALLELOGRAMS** below:

1. opposite sides are \cong
2. opposite sides are \parallel
3. opposite \angle 's are \cong
4. consecutive \angle 's are supplementary
5. diagonals bisect each other

A **RECTANGLE** is a parallelogram with \cong diagonals and 4 right \angle 's.

A **RHOMBUS** is a parallelogram with \perp diagonals that bisect opp. \angle 's.

A **SQUARE** is a parallelogram with 4 right \angle 's and \cong \perp diagonals that bisect opp. \angle 's.

A **TRAPEZOID** is a quadrilateral with one pair of opp sides \parallel .

An **ISOSCELES TRAPEZOID** is a trapezoid with \cong base $\&$'s, \cong diagonals

and consecutive $\&$'s supplementary

To find the **MIDSEGMENT** in a trapezoid: $\frac{\text{base} + \text{base}}{2}$

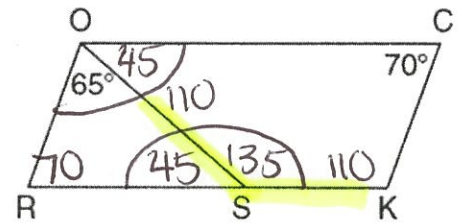
1. If the diagonals of a quadrilateral do not bisect each other, then the quadrilateral could be a

- 1) rectangle
- 2) rhombus
- 3) square
- 4) Trapezoid

* 2. In the diagram below of parallelogram $ROCK$, $m\angle C$ is 70° and $m\angle ROS$ is 65° .

What is $m\angle KSO$?

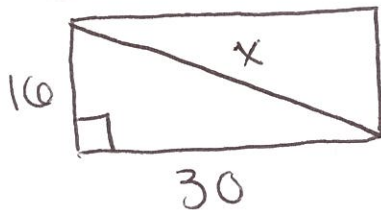
- 1) 45°
- 2) 110°
- 3) 115°
- 4) 135°



$$180 - 70 = 110$$

3. 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



$$16^2 + 30^2 = x^2$$

$$256 + 900 = x^2$$

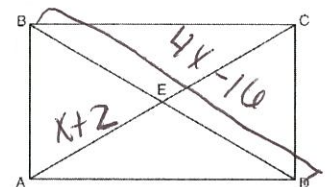
$$\sqrt{1156} = \sqrt{x^2}$$

$$x = 34$$

* 4. As shown in the diagram of rectangle $ABCD$ below, diagonals \overline{AC} and \overline{BD} intersect at E .

If $AE = x + 2$ and $BE = 4x - 16$, then the length of \overline{AC} is

- 1) 6
- 2) 10
- 3) 12
- 4) 24



$$2(x+2) = 4x-16$$

$$2x+4 = 4x-16$$

$$-2x+16 = -2x+16$$

$$AC = 2(10+2) = \boxed{24}$$

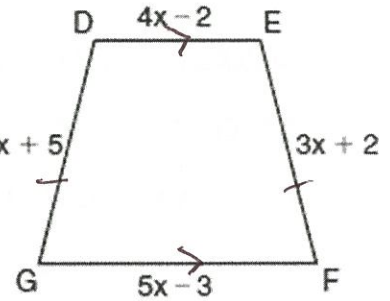
$$20 = 2x$$

$$x = 10$$

5. In the diagram below of isosceles trapezoid $DEFG$, $\overline{DE} \parallel \overline{GF}$, $DE = 4x - 2$, $EF = 3x + 2$, $FG = 5x - 3$, and $GD = 2x + 5$. Find the value of x . Explain your solution.

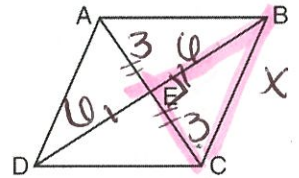
$$\begin{array}{r} 2x + 5 = 3x + 2 \\ -2x \quad -2 \quad -2x \quad -2 \\ \hline 3 = x \end{array}$$

The non-parallel sides of an isosceles trap. are \cong



- ★ 6. In the diagram below of rhombus $ABCD$, the diagonals \overline{AC} and \overline{BD} intersect at E . If $AC = 6$ and $BD = 12$, what is the length of one side of rhombus $ABCD$?

$$\begin{array}{l} 3^2 + 6^2 = x^2 \\ 9 + 36 = x^2 \\ \sqrt{45} = \sqrt{x^2} \\ \sqrt{9} \sqrt{5} \\ \boxed{3\sqrt{5}} = x \end{array}$$

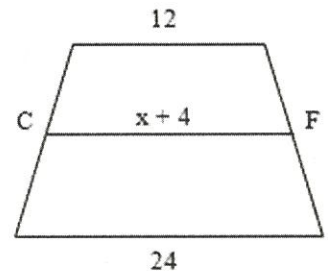


7. In a certain quadrilateral, two opposite sides are parallel, and the other two opposite sides are not congruent. This quadrilateral could be a

- 1) rhombus
 2) parallelogram
 3) square
 4) Trapezoid

8. Given trapezoid with midsegment CF , find the value of x .

$$\begin{array}{l} \frac{12 + 24}{2} = \frac{x + 4}{1} \\ 2(x + 4) = 36 \\ 2x + 8 = 36 \\ 2x = 28 \\ \boxed{x = 14} \end{array}$$



- ★ 9. A regular polygon with an exterior angle of 40° is a

- 1) pentagon
 2) hexagon
 3) nonagon
 4) decagon

$$\begin{array}{l} \frac{360}{n} = \frac{40}{1} \\ 40n = 360 \\ n = 9 \end{array}$$

- ★ 10. The sum of the interior angles of a regular polygon is 720° . Determine and state the number of degrees in one interior angle of the polygon.

$$\begin{array}{l} 180(n - 2) = 720 \\ 180n - 360 = 720 \\ 180n = 1080 \end{array}$$

$$\frac{720}{6} = \boxed{120^\circ}$$

$n = 6$
HEXAGON