

Friday, November 30, 2012

Agenda:

- TISK, No MM
- Upcoming Important Dates
- Solve problems using properties of trapezoids and kites.
- Homework: No HW – Project Work Weekend

TISK Problems

1. Simplify: $(4x - 3)^2$
2. Factor completely: $5x^2 - 37x - 24$
3. Simplify: $\frac{3x^2 + 9x}{x + 3}$

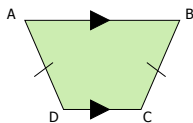
§6.5 Trapezoids & Kites

Definitions

- A **trapezoid** is a quadrilateral with exactly one pair of parallel sides.
 - The parallel sides are the BASES
 - A trapezoid also has two pairs of base angles.
- An **Isosceles Trapezoid** is a trapezoid whose legs are congruent.

Theorems

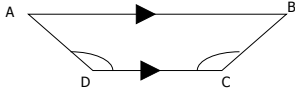
- If a trapezoid is isosceles, then each pair of base angles is congruent.



If ABCD is an isos. trap., then
 $\angle A \cong \angle B$ and $\angle C \cong \angle D$

Theorems

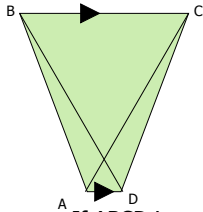
- If a trapezoid has a pair of congruent base angles, then it is an isosceles trapezoid.



If ABCD is a trapezoid and $\angle C \cong \angle D$ or $\angle A \cong \angle B$ then ABCD is an isosceles trapezoid.

Theorems

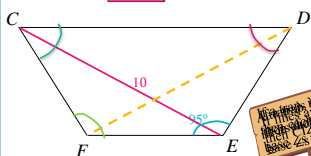
- A trapezoid is isosceles if and only if its diagonals are congruent.



If ABCD is an isos. trap., then $\overline{AC} \cong \overline{BD}$
If $\overline{AC} \cong \overline{BD}$, then ABCD is an isos. trap.

Examples

- CDEF is an isosceles trapezoid, with $CE = 10$ and $m\angle E = 95^\circ$. Find DF , $m\angle C$, $m\angle D$, & $m\angle F$.



$DF = 10$ $m\angle F = 95^\circ$
 $m\angle C = 85^\circ$ $m\angle D = 85^\circ$

$$\begin{aligned} \overline{CE} &\cong \overline{DF} & \angle E &\cong \angle F \\ CE &= DF & m\angle E &= m\angle F \\ m\angle E + m\angle D &= 180^\circ & & \\ 95^\circ + m\angle D &= 180^\circ & & \end{aligned}$$



Examples

- The vertices of WXYZ are W(-1, 2), X(3, 0), Y(4, -3), and Z(-4, 1). Show that WXYZ is an isosceles trapezoid.

$$m_{ZW} = \frac{1}{3}$$

$$m_{WX} = -\frac{1}{2}$$

$$m_{XY} = -3$$

$$m_{YZ} = -\frac{1}{2}$$

\therefore it's a trapezoid.

$$ZW = \sqrt{(-4+1)^2 + (1-2)^2}$$

$$ZW = \sqrt{(-3)^2 + (-1)^2}$$

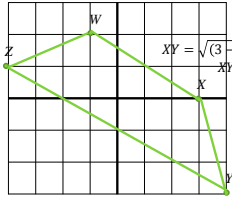
$$ZW = \sqrt{10}$$

$$XY = \sqrt{(3-4)^2 + (0-(-3))^2}$$

$$XY = \sqrt{(-1)^2 + (3)^2}$$

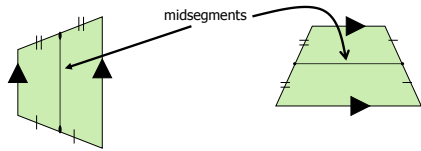
$$XY = \sqrt{10}$$

\therefore it's isosceles.



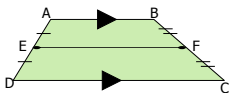
Definitions

- The **midsegment** of a trapezoid is the segment that connects the midpoints of its legs.



Theorems

- Midsegment Theorem for Trapezoids
 - The midsegment of a trapezoid is parallel to each base and its length is one half the sum of the lengths of the bases.

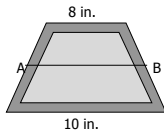


$$\overline{AB} \parallel \overline{EF}, \overline{CD} \parallel \overline{EF}$$

$$EF = \frac{1}{2}(AB + CD)$$

Examples

- A potter crafts a trapezoidal relish dish, placing a divider, shown by \overline{AB} , in the middle of the dish. How long must the divider be to ensure that it divides the legs in half?



For the divider to divide the legs in half, it must be a midsegment.

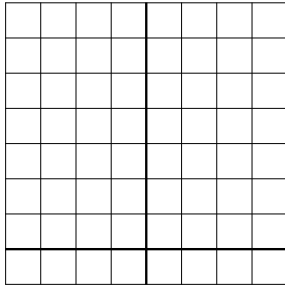
$$\therefore AB = \frac{1}{2}(8 + 10)$$

$$AB = \frac{1}{2}(18)$$

$$AB = 9 \text{ in.}$$

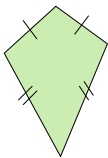
Check Points

The vertices of $KLMN$ are $K(-3, 5)$, $L(0, 7)$, $M(2, 7)$, and $N(3, 5)$. Is $KLMN$ a trapezoid? If it is, tell whether it is isosceles and find its midsegment length.



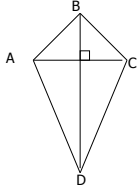
Definitions

- A **kite** is a quadrilateral that has two pairs of consecutive congruent sides, but opposite sides are not congruent.



Theorems

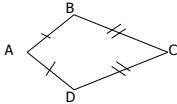
- If a quadrilateral is a kite, then its diagonals are perpendicular.



If ABCD is a kite, then $\overline{AC} \perp \overline{BD}$

Theorems

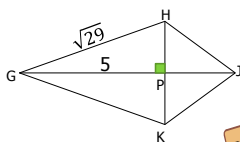
- If a quadrilateral is a kite, then exactly one pair of opposite angles are congruent.



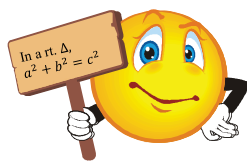
If ABCD is a kite, then $\angle B \cong \angle D$ and $\angle A \not\cong \angle C$.

Examples

- $\triangle GHJK$ is a kite. Find HP .

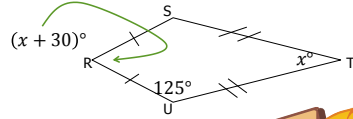


$$\begin{aligned} 5^2 + HP^2 &= (\sqrt{29})^2 \\ 25 + HP^2 &= 29 \\ HP^2 &= 4 \\ HP &= 2 \end{aligned}$$



Examples

- RSTU is a kite. Find $m\angle R$, $m\angle S$, and $m\angle T$.



$$\begin{aligned}
 125 &= m\angle S \\
 250 + x + 30 + x &= 360 \\
 280 + 2x &= 360 \\
 2x &= 80 \\
 x &= 40
 \end{aligned}$$



Check Points

- 1) Find the length of each side of the kite shown.
- 2) If $m\angle ADC = 92^\circ$ and $m\angle ABC = 128^\circ$, find $m\angle BAD$ and $m\angle BCD$.

