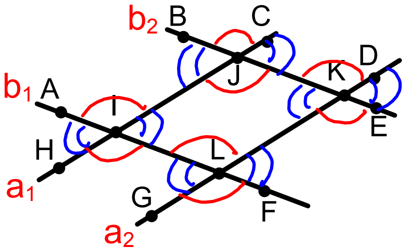


Given $a_1 || a_2$ and $b_1 || b_2$, what else do we know?

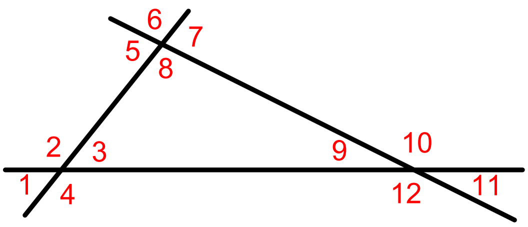
IJKL is a parallelogram

JI = KL & JK = IL

diagonals IK & JL bisect each other

∠AIH & ∠HIL are supplementary - linear pair

∠ILK & ∠JKL are supplementary - interior ∠'s on same side of transversal



$\angle 8 + \angle 9 + \angle 3 = 180°$

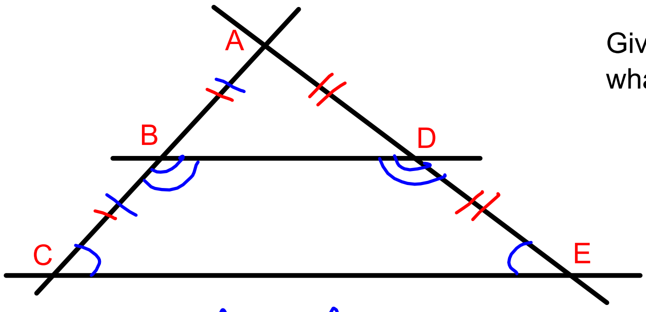
$\angle 1 = \angle 3$ etc

$\angle 2 > \angle 8$ and $\angle 2 > \angle 9$

$\angle 2 = \angle 8 + \angle 9 = \angle 4$

$\angle 5 = \angle 3 + \angle 9 = \angle 7$

$\angle 10 = \angle 3 + \angle 8 = \angle 12$



Given AB=BC and AD=DE, what else do we know?

BD is a midsegment of $\triangle ACE$

$\Rightarrow$ $BD \parallel CE$ &

$BD = \frac{1}{2} CE$

BDEC is a trapezoid

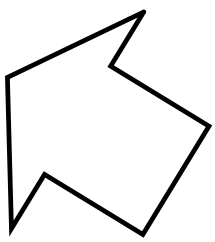
Suppose $BA = DA$,

$\Rightarrow$ BDEC is an isosceles trapezoid

$\Rightarrow \angle BCE \cong \angle DEC$

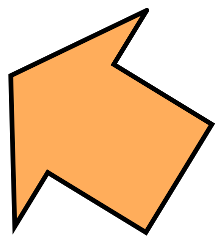
$\angle DBC \cong \angle BDE$

9.1 - Area



The black line is the polygon.

The region bounded by that polygon is a polygonal region.



When we find the area of a polygon, we are actually finding the area of the polygonal region bounded by that polygon.

Postulate 8 - The Area Postulate

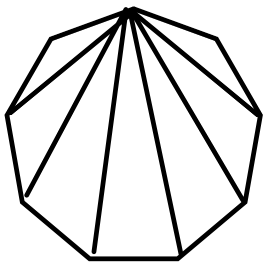
Every polygonal region has a positive number called its area such that

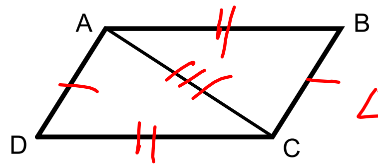
(1) congruent triangles have equal areas $\alpha\triangle ABC = \alpha\triangle CDA$

alpha means "area of"

(2) the area of a polygonal region is equal to the sum of the areas of its nonoverlapping parts

$$\alpha ABCD = \alpha\triangle ABC + \alpha\triangle CDA$$





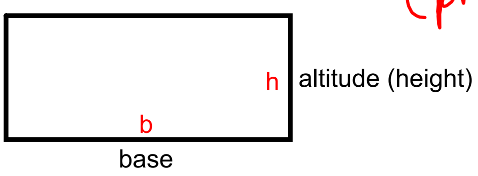
ABCD is a parallelogram

$\triangle ABC \cong \triangle CDA$

9.2 - Squares and Rectangles

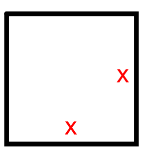
Postulate 9 - The area of a rectangle is the product of its base and altitude

(product of 2 perpendicular side lengths)



$A = bh$

Corollary to Postulate 9 - The area of a square is the square of its side



$A = x^2$

To divide a square into smaller squares each having a different area was once thought to be impossible. The figure seems to show a solution.

Given that the areas of squares C and D are 64 and 81 square units respectively, find the areas of the other squares.

I has area $1^2 = 1$

H has area $7^2 = 49$

E has area $10^2 = 100$

B has area $15^2 = 225$

G has area $4^2 = 16$

F has area $14^2 = 196$

A has area $18^2 = 324$

$$18^2 = (10+8)^2$$

$$= (10+8)(10+8)$$

$$= 10^2 + 2(8)(10) + 8^2$$

$$= 100 + 160 + 64$$

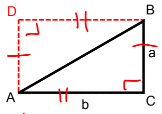
$$= 324$$

$$(a+b)^2 = (a+b)(a+b)$$

$$= a^2 + 2ab + b^2$$

9.3 - Triangles

Theorem 38 - The area of a right triangle is half the product of its legs.



Given: Right $\triangle ABC$ with legs a and b

Prove: $\alpha\triangle ABC = \frac{1}{2}ba$

Statements	Reasons
1. $\triangle ABC$ is a right $\triangle$ w/ legs a and b	Given
2. Draw DB & AD through D so that $DB \parallel AC$ & $AD \parallel CB$	Parallel Postulate
3. ADBC is a parallelogram	(Def. of parallelogram)
4. DB = AC and AD = CB	opposite edges of a parallelogram are equal
5. $\angle C = \angle D$	opposite $\angle$'s in a parallelogram are equal
6. $\triangle ABC \cong \triangle BAD$	SAS congruence
7. $\angle DAC$ & $\angle DBC$ are supplements of right $\angle$'s and hence are right $\angle$'s	parallelogram forms supplementary interior $\angle$'s on same side of transversal
8. ADBC is a rectangle	(def of rectangle as having all right $\angle$'s)
9. $\alpha ADBC = ba$	area of rectangle is base times altitude
10. $\alpha\triangle ABC = \alpha\triangle BAD$ $\alpha ADBC = \alpha\triangle ABC + \alpha\triangle BAD$	Area Postulate
11. $\alpha ADBC = \alpha\triangle ABC + \alpha\triangle ABC$ $\alpha ADBC = 2\alpha\triangle ABC$	substitution (#10)
12. $ba = 2\alpha\triangle ABC$	substitution (#9 & 11)
13. $\frac{1}{2}ba = \alpha\triangle ABC$	division

HW #7 (due Fri. 01/16)

- Ch 8 Review (pp. 325-329)
- Midterm Review (pp. 330-336)

Test #3 - Friday 01/16

Note: I have Office Hours today (Wednesday, 01/14) at 3:45!