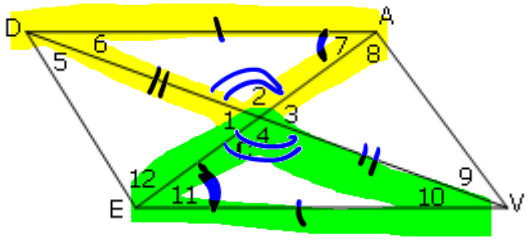
Math 1312
Section 3.1 review & Section 3.2
Congruent Triangles

Example 1



Refer to quadrilateral DAVE.

a. Name the included side for ∠1 and ∠5.

$\overline{DC}$

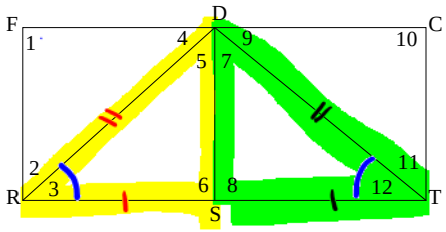
b. If ∠6 ≅ ∠10, and $\overline{DC} \cong \overline{VC}$, then ΔDCA ≅ Δ VCE by ASA.

∠2 ≅ ∠4 (as vertical)

c. Given that ∠7 ≅ ∠11, $\overline{AD} \cong \overline{EV}$, and $\overline{DC} \cong \overline{VC}$. Can ΔADC ≅ ΔEVC? Explain.

NO (given that info)
YES (AAS)

Example 2



a. Name the included side for ∠1 and ∠4.

$\overline{FD}$

b. $\overline{CT}$ is included between what two angles?

∠10 & ∠11

c. In ΔFDR, name a pair of angles so that $\overline{FR}$ is not included.

∠1 & ∠4 or ∠2 & ∠4

d. If ∠1 ≅ ∠6, ∠4 ≅ ∠3, and $\overline{FR} \cong \overline{DS}$, then ΔFDR ≅ Δ SRD by AAS.

e. If ∠4 ≅ ∠9, what sides would need to be congruent to show ΔFDR ≅ Δ CDT?

(SAS) $\overline{FD} \cong \overline{CD}$ & $\overline{DR} \cong \overline{DT}$

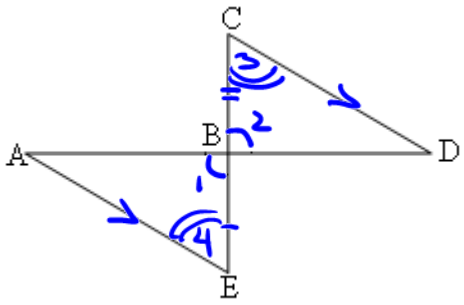
f. If $\overline{RS} \cong \overline{TS}$ and $\overline{DR} \cong \overline{DT}$, name a pair of angles that would create an SAS relationship.

∠3 ≅ ∠12

Example 3

Given: $\overline{CD} \parallel \overline{AE}, \overline{CB} \cong \overline{EB}$

Prove: $\Delta ABE \cong \Delta DBC$



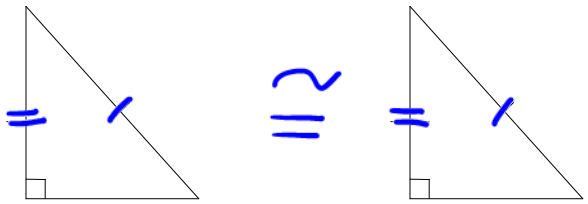
Statements	Reasons
1. $\overline{CD} \parallel \overline{AE}, \overline{CB} \cong \overline{EB}$	1. Given
2. $\angle 1 \cong \angle 2$	2. Vertical $\angle$s.
3. $\angle 3 \cong \angle 4$	3. Alt. Int. $\angle$s with $\parallel$ lines.
4. $\Delta ABE \cong \Delta DBC$	4. ASA

CPCTC – Corresponding Parts of Congruent Triangles are Congruent

Once we prove two triangles are congruent, we can state that any corresponding parts are congruent by CPCTC.

Right Triangles

Principle HL: If the hypotenuse and a leg of one right triangle are congruent to the hypotenuse and corresponding leg of another right triangle, then the triangles are congruent.



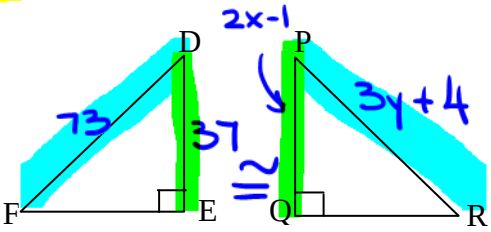
Example 4

These triangles are congruent by HL. Find the values of "x" and "y".

x = 19

y = 23

$\overline{FD}$ = 73
$\overline{DE}$ = 37
$\overline{PQ}$ = 2x - 1
$\overline{RP}$ = 3y + 4



$3y + 4 = 73$

$3y = 69$

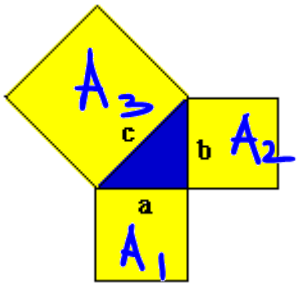
$y = 23$

$2x - 1 = 37$

$2x = 38$

$x = 19$

Pythagorean Theorem:
The sum of the squares of the lengths of the legs of a right triangle ('a' and 'b' in the triangle shown below) is equal to the square of the length of the hypotenuse ('c').



$A_1 + A_2 = A_3$

$a^2 + b^2 = c^2$

In other words, $a^2 + b^2 = c^2$

Note: Since we are working with lengths of sides here *if* $x^2 = p$, *then* $x = \sqrt{p}$ (we only need positive square root.

$\sqrt{25} = \pm 5$

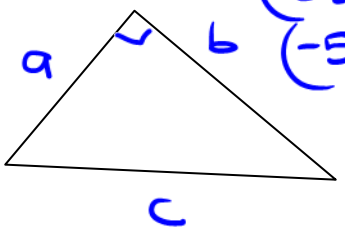
$(5)^2 = 25$

$(-5)^2 = 25$

Example 5:

a) Find *c* if *a* = *4* and *b* = *3*.

b) Find *b* if *a* =*15* and *c* = *17*.



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

$c^2 = (4)^2 + (3)^2$

$\sqrt{c^2} = \sqrt{25}$

$c = 5$

(3, 4, 5)

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

$17^2 = 15^2 + b^2$

$b^2 = 17^2 - 15^2$

$= 289 - 225$

$\sqrt{b^2} = \sqrt{64}$

$b = 8$

(8, 15, 17)