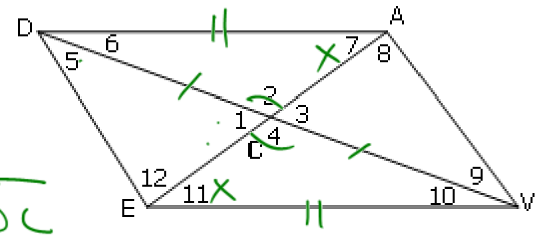
Math 1312 Notes: 3.1 review and 3.2

3.1 Review

Example 1



Refer to quadrilateral DAVE.

a. Name the included side for ∠1 and ∠5. $\overline{DC}$

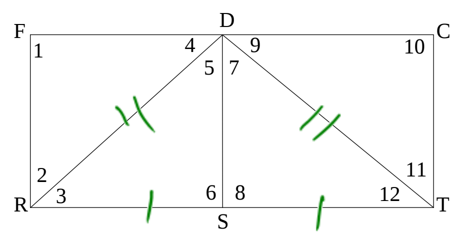
b. If ∠6 ≅ ∠10, and $\overline{DC} \cong \overline{VC}$, then ΔDCA ≅ Δ<u>VCE</u> by <u>ASA</u>.

∠2 ≅ ∠4 (VA)

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

Yes ΔADC ≅ ΔEVC 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.

∠2 & ∠4

∠1 & ∠4

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

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

1) FD & DC

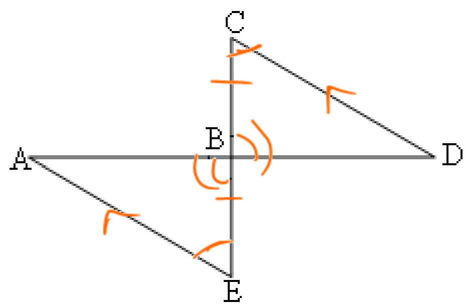
2) RD & DT

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

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

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



Statements	Reasons
1) $\overline{CD} \parallel \overline{AE}$ $\overline{CB} \cong \overline{ED}$	1) Given
2) $\angle ABE \cong \angle DBC$	2) Vertical $\angle$s are $\cong$
3) $\angle E \cong \angle C$	3) CE is transversal Alt Int $\angle$s are $\cong$
4) $\Delta ABE \cong \Delta DBC$	4) ASA

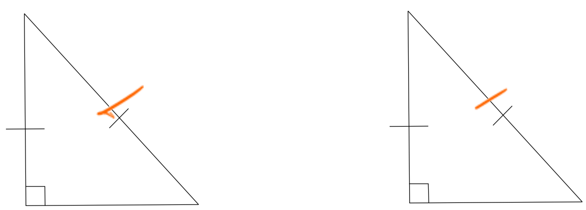
3.2

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:

Postulate 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.

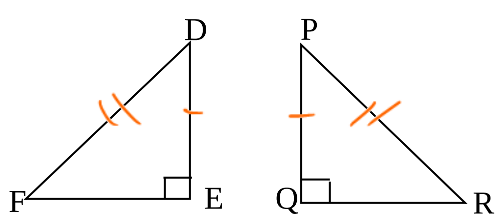


Example 1:
These triangles are congruent by HL. Find the values of "x" and "y".

x = 19

y = 23

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



$PQ = DE$

$2x - 1 = 37$

$2x = 38$

$x = 19$

$PR = DF$

$3y + 4 = 73$

$3y = 69$

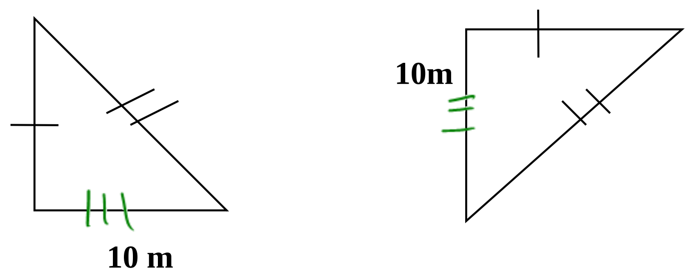
$y = 23$

Example 2:
Decide if each of these triangles are congruent.

a.

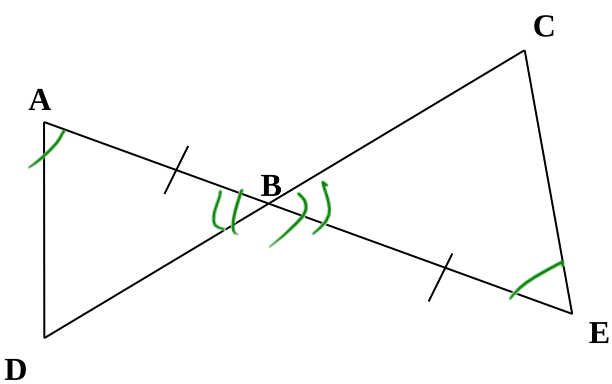
SAS

b.



SSS

c.

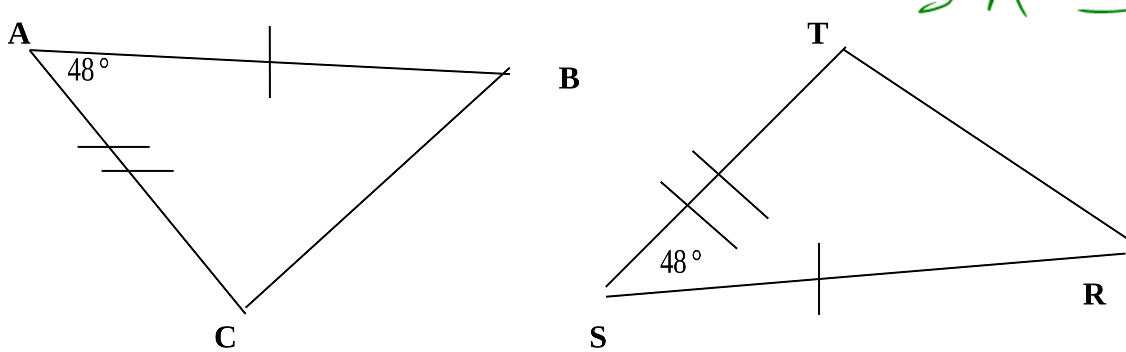


$\angle BAD \simeq \angle CEB$

ASA

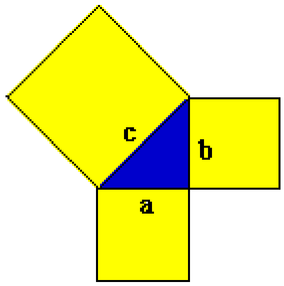
SAS

d.



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').



$\sqrt{4 \cdot 3} = \sqrt{4} \cdot \sqrt{3}$

$\sqrt{5^2+3^2} = \sqrt{5^2} + \sqrt{3^2}$ X

$= \sqrt{34}$ ✓ $\quad = 5 + 3$

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

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

Example 3:

a. If $x^2=16$, then $x = \sqrt{16} \Rightarrow x = 4$

b. If $x^2=12$, then $x = \sqrt{12} \Rightarrow x = \sqrt{4 \cdot 3} = \sqrt{4} \cdot \sqrt{3}$
$= 2\sqrt{3}$

Example 4: Given ΔABC is a right triangle. Use the information to find the length of the third side.

a. a = 4 and c = 8

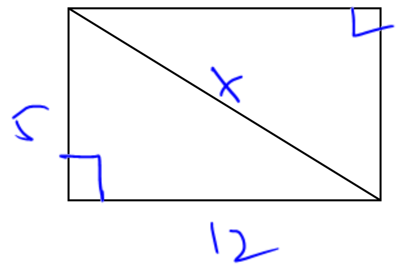
$a^2+b^2=c^2 \Rightarrow 4^2+b^2=8^2 \Rightarrow 16+b^2=64$
$\Rightarrow b^2=48 \Rightarrow b=\sqrt{48}$
$=\sqrt{16 \cdot 3}$
$=\sqrt{16} \cdot \sqrt{3}$
$=4\sqrt{3}$

b. a =2 and b = 1

$a^2+b^2=c^2$
$2^2+1^2=c^2$
$4+1=c^2$
$5=c^2 \Rightarrow \sqrt{5}=c$

Example 5: The sides of a rectangle are 5 and 12. find the length of the diagonal.

$$x^2 = 5^2 + 12^2$$
$$= 25 + 144$$
$$= 169$$
$$x = \sqrt{169} = 13$$



Example 6: Find the length of side of a square if a diagonal has a length of 8.

$$x^2 + x^2 = 8^2$$
$$2x^2 = 64$$
$$x^2 = 32$$
$$x = \sqrt{32}$$
$$= \sqrt{16 \cdot 2} = 4\sqrt{2}$$