

Unit 2 Study Guide Part 1 Angles, Triangle Congruence, and Proofs

Theorems about Lines and Angles

1. Name the relationship and then find the missing angle measures by solving for x .

a. **Alternate Exterior $\rightarrow \cong$**

$2x + 10 = 86 + x$
 $-x \quad -10$
 $x = 76$

b. **Linear Pairs $\rightarrow = 180$**

$4(12) + 6 = 54$
 $11(12) - 6 = 126$
 $15x = 180$
 $x = 12$

c. **Vertical Angles**

$4x + 24 = 7x + 3$
 $-4x \quad -3$
 $21 = 3x$
 $x = 7$

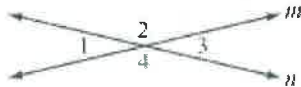
d.

$6(15) + 7 = 97$
 $9x + 45 = 180$
 $-45 \quad -45$
 $9x = 135$
 $x = 15$

2. The measure of one angle is 38 more than three times its supplement. Find the measure of each angle.

$\angle 1 = x$
 $\angle 2 = 3x + 38$
 $4x + 38 = 180$
 $-38 \quad -38$
 $4x = 142$
 $x = 35.5$
 $\angle 1 = 35.5^\circ$
 $\angle 2 = 144.5^\circ$

3. Determine what steps are missing from the following proofs.



Prove: $\angle 1 \cong \angle 3$

Statement	Justification
1. $m\angle 1 + m\angle 2 = 180$	1. Linear Pair
2. $m\angle 2 + m\angle 3 = 180$	2. Linear Pair
3. $m\angle 1 + m\angle 3 = 180$	3. Substitution
4. $\angle 1 = \angle 3$	4. Definition of congruent angles subtraction

$\angle 1 + \angle 2 = \angle 2 + \angle 3$

Congruent Triangles

Determine whether each pair of triangles is congruent. If so, write a congruence statement, and explain why the triangles are congruent.

4) SAS

$\triangle RPS \cong \triangle QPS$

5) AAS

$\triangle GHI \cong \triangle JKI$

6) SAS

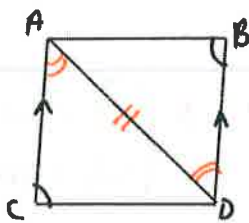
$\triangle LMN \cong \triangle NOL$

7) For $\triangle ABC$ and $\triangle DEF$ the following is given: $\angle A \cong \angle D$, $\angle B \cong \angle E$, $\overline{AB} \cong \overline{DE}$. Sketch a picture to determine if the two triangles can be proven congruent. If so, create a two column proof.

S	R
$\angle A \cong \angle D$	G
$\angle B \cong \angle E$	G
$\overline{AB} \cong \overline{DE}$	G
$\triangle ABC \cong \triangle DEF$	ASA

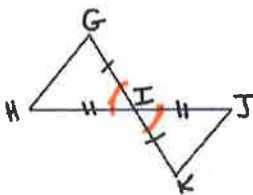
Complete the following Two-Column proofs.

8.



Statement	Reason
1. $\overline{AC} \parallel \overline{DB}$	1. Given
2. $\angle C \cong \angle B$	2. Given
3. $\angle CAD \cong \angle BDA$	3. Alt. Int. \angle 's
4. $\overline{AD} \cong \overline{AD}$	4. Reflexive Property
5. $\triangle ACD \cong \triangle DBA$	5. AAS

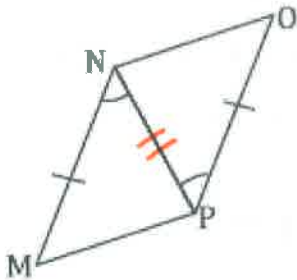
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Statement	Reason
1. $\overline{GI} \cong \overline{KI}$	1. Given
2. $\overline{HI} \cong \overline{JI}$	2. Given
3. $\angle GIH \cong \angle KIJ$	3. Vertical \angle 's
4. $\triangle GIH \cong \triangle KIJ$	4. SAS

10.

Given: $\angle MNP \cong \angle OPN$, and $\overline{MN} \cong \overline{OP}$

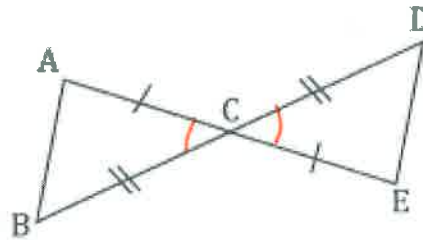


Prove: $\overline{MP} \cong \overline{NO}$

Statements	Reasons
1. $\angle MNP \cong \angle OPN$	1. Given
2. $\overline{MN} \cong \overline{OP}$	2. Given
3. $\overline{NP} \cong \overline{NP}$	3. Reflexive
4. $\triangle MNP \cong \triangle OPN$	4. SAS
5. $\overline{MP} \cong \overline{NO}$	5. CPCTC

11.

Given: $\overline{AC} \cong \overline{CE}$, $\overline{DC} \cong \overline{BC}$

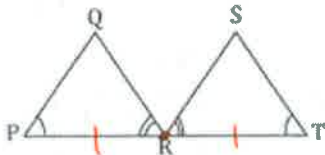


Prove: $\angle B \cong \angle D$

Statements	Reasons
1. $\overline{AC} \cong \overline{CE}$	1. Given
2. $\overline{DC} \cong \overline{BC}$	2. Given
3. $\angle ACB \cong \angle DCE$	3. Vertical
4. $\triangle ABC \cong \triangle DEC$	4. SAS
5. $\angle B \cong \angle D$	5. CPCTC

12.

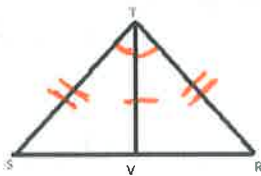
Given: R is the midpoint of \overline{PT} , $\angle P \cong \angle T$, $\angle PRQ \cong \angle TRS$



Statement	Reason
1. R is midpoint of PT	1. Given
2. $\overline{PR} \cong \overline{RT}$	2. Def of midpoint
3. $\angle P \cong \angle T$	3. Given
4. $\angle PRQ \cong \angle TRS$	4. Given
5. $\triangle PQR \cong \triangle TRS$	5. ASA

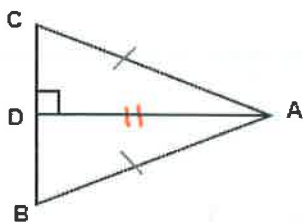
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Given: VT bisects $\angle STR$, $\overline{ST} \cong \overline{TR}$



Statement	Reason
1. VT bisects $\angle STR$	1. Given
2. $\angle STV \cong \angle RTV$	2. Def of bisect
3. $\overline{ST} \cong \overline{TR}$	3. Given
4. $\overline{TV} \cong \overline{TV}$	4. Reflexive
5. $\triangle STV \cong \triangle RTV$	5. SAS
6. $\angle SVT \cong \angle RVT$	6. CPCTC

14. Write either a two-column proof or a paragraph proof to show that the base angles in an isosceles triangle are congruent. In other words, show that $\angle C \cong \angle B$.

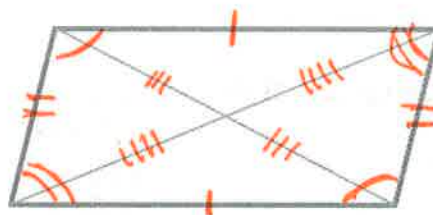


S	R
$\overline{AC} \cong \overline{AB}$	Given
$\angle ADC \cong \angle ADB$	Right Angle congruence
$\overline{AD} \cong \overline{AD}$	Reflexive
$\triangle ABD \cong \triangle ACD$	HL
$\angle C \cong \angle B$	CPCTC

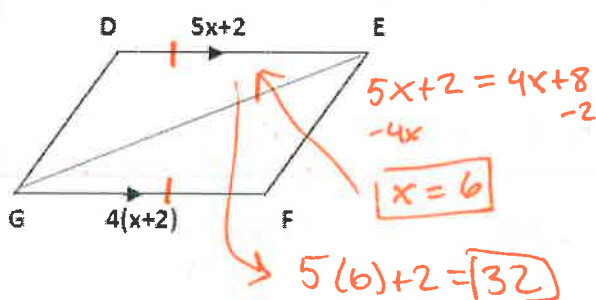
Properties of Parallelograms

Use the following parallelogram to mark these properties:

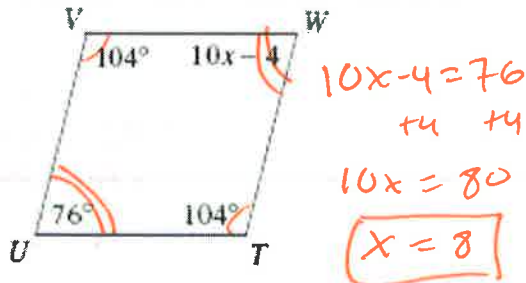
1. Opposite sides are parallel and congruent
2. Opposite angles are congruent
3. Consecutive angles are supplementary
4. The two diagonals bisect one another



15. $\triangle GDE \cong \triangle EFG$. Find the length of DE .



16. $\triangle VWT \cong \triangle TUV$. Find the value of x .



Remember you can't put a CPCTC before a triangle congruency rule.

17. State what CPCTC stands for: Corresponding parts of congruent triangles are congruent.

When to use? use when trying to prove parts of triangles are congruent.

Why it works? If triangles are congruent then All of the corresponding parts must be congruent.