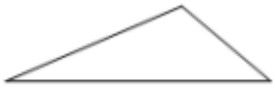
Triangle Congruence

Chapter 4
Review 2

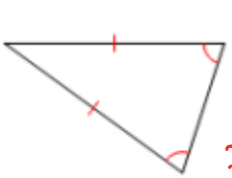
Classify each triangle by its sides (scalene, isosceles, or equilateral) as well as by its angles (acute, obtuse, or right).

1)



This Δ appears to be obtuse scalene.

2)

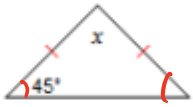


This triangle appears to be acute.

Isosceles Acute Δ

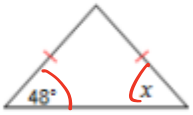
Find the value of x.

3)



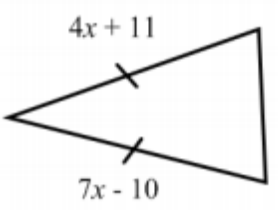
$x+45+45=180$
$x+90=180$
$x=90$

4)



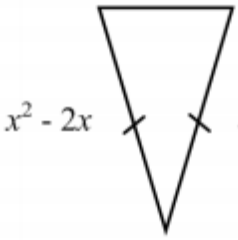
$x=48$

5)



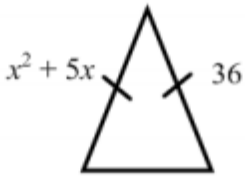
$4x+11=7x-10$
$11=3x-10$
$21=3x$
$7=x$

6)



$x^2-2x=48$
$x^2-2x-48=0$
$(x-8)(x+6)=0$
$x-8=0$ | $x+6=0$
$x=8$ | $x=-6$

7)



$x^2+5x=36$
$x^2+5x-36=0$
$(x+9)(x-4)=0$
$x+9=0$ | $x-4=0$
$x=-9$ | $x=4$

#8) What is the definition of an isosceles triangle?

A Δ with at least 2 sides congruent.

#9) What is the converse to the isosceles triangle theorem?

If two angles are congruent in a Δ, then the sides opposite those sides are congruent.

Triangle Congruence

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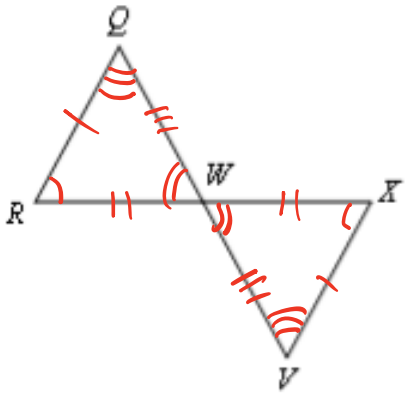
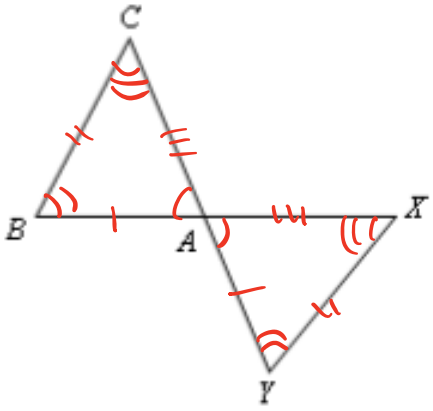
Mark the angles and sides of each pair of triangles to indicate that they are congruent.

10) $\Delta WXV \cong \Delta WRQ$



11) $\Delta ABC \cong \Delta AYX$



Complete each congruence statement by naming the corresponding angle or side.

12) $\Delta FGH \cong \Delta JKL$

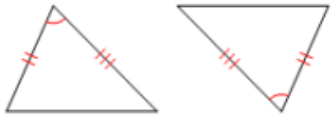
$\angle H \cong ?$ $\angle L$

13) $\Delta DFE \cong \Delta XYZ$

$\overline{ED} \cong ?$ $\overline{ZX}$

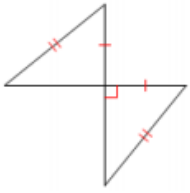
State if the two triangles are congruent. If they are, state how you know.

26)



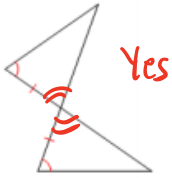
Yes SAS Postulate

27)



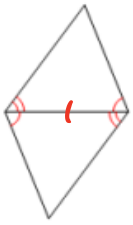
Yes HL Postulate

28)



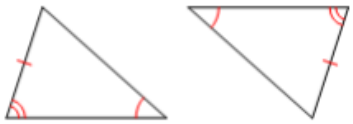
Yes ASA Postulate

29)



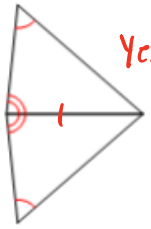
Yes ASA postulate

30)



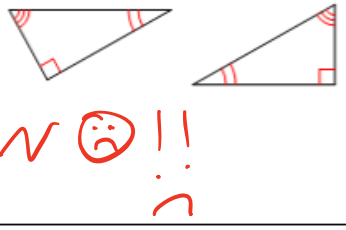
Yes AAS Postulate

31)



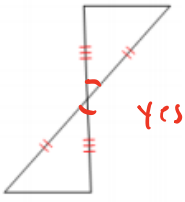
Yes AAS Postulate

32)



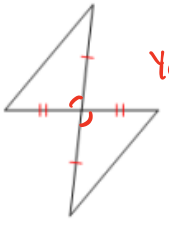
Not !!

33)



Yes SAS Postulate

34)



Yes SAS postulate

Triangle Congruence

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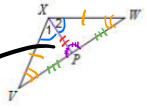
For each proof, mark the picture and complete the proof.

#23)

Given: ΔVXW is an isosceles triangle with base $\overline{VW}$
$\overline{XP}$ is an angle bisector of $\angle VXW$
P is the midpoint of $\overline{VW}$
$\angle VPX \cong \angle WPX$

Prove: $\Delta PVX \cong \Delta PWX$

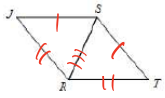


STATEMENTS	REASONS
1. ΔVXW is an isosceles triangle $\overline{XP}$ is an angle bisector of $\angle VXW$ P is the midpoint of $\overline{VW}$ $\angle VPX \cong \angle WPX$	1. Given
2. $\overline{XP} \cong \overline{XP}$	2. Congruence of Segments is reflexive
3. $\overline{VX} \cong \overline{XW}$	3. Def'n of Isosceles Δ
4. $\overline{VP} \cong \overline{PW}$	4. Midpoint Th'm
5. $\angle VXP \cong \angle WXP$	5. Def'n of angle bisector
6. $\angle XVP \cong \angle XWP$	6. Isosceles Δ Theorem
7. $\Delta PVX \cong \Delta PWX$	7. Def'n of $\cong$ Δs

#24)

Given: $\overline{ST} \cong \overline{SJ}$
$\overline{JR} \cong \overline{TR}$

Prove: $\Delta RST \cong \Delta RSJ$

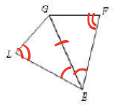


STATEMENTS	REASONS
$\overline{ST} \cong \overline{SJ}$ $\overline{JR} \cong \overline{TR}$	Given
$\overline{SR} \cong \overline{SR}$	Congruence of Segments is Reflexive (or Reflexive prop of $\cong$)
$\Delta RST \cong \Delta RSJ$	SSS $\cong$ Postulate

#25)

Given: $\overline{GE}$ is the angle bisector of $\angle LEF$
$\angle L \cong \angle F$

Prove: $\Delta LEG \cong \Delta FEG$

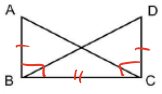


STATEMENTS	REASONS
$\overline{GE}$ is the $\angle$ bisector of $\angle LEF$ $\angle L \cong \angle F$	Given
$\angle LEG \cong \angle GEF$	Def'n of bisector
$\overline{GE} \cong \overline{GE}$	Congruence of Segments is Reflexive (or Reflexive prop. of $\cong$)
$\Delta LEG \cong \Delta FEG$	AAS $\cong$ Postulate

#26)

Given: $\overline{AB} \cong \overline{DC}$
$\angle ABC$ and $\angle DCB$ are right angles

Prove: $\Delta ABC \cong \Delta DCB$



STATEMENTS	REASONS
$\overline{AB} \cong \overline{DC}$ $\angle ABC$ and $\angle DCB$ are right angles	Given
$\angle ABC \cong \angle DCB$	All right $\angle$s are congruent
$\overline{BC} \cong \overline{BC}$	Congruence of Segments is Reflexive (or Reflexive prop of $\cong$)
$\Delta ABC \cong \Delta DCB$	SAS $\cong$ Postulate

Triangle Congruence

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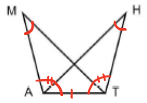
#27)

Given: $\angle M \cong \angle H$
$\angle MAT \cong \angle HTA$

Prove: $\Delta MAT \cong \Delta HTA$

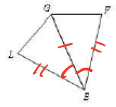


STATEMENTS	REASONS
$\angle M \cong \angle H$ $\angle MAT \cong \angle HTA$	Given
$\overline{AT} \cong \overline{AT}$	Congruence of Segments is Reflexive (or Reflexive prop. of $\cong$)
$\Delta MAT \cong \Delta HTA$	AAS $\cong$ Postulate

#28)

Given: $\overline{GE}$ is the angle bisector of $\angle LEF$
$\overline{LE} \cong \overline{FE}$

Prove: $\overline{LG} \cong \overline{FG}$

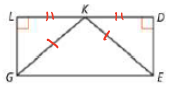


STATEMENTS	REASONS
$\overline{GE}$ is the angle bisector of $\angle LEF$ $\overline{LE} \cong \overline{FE}$	Given
$\angle LEG \cong \angle FEG$	Def'n of angle bisector
$\overline{GE} \cong \overline{GE}$	Congruence of Segments is Reflexive
$\Delta LEG \cong \Delta FEG$	SAS $\cong$ Postulate
$\overline{LG} \cong \overline{FG}$	CPCTC

#29)

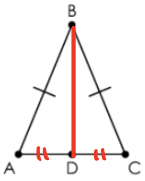
Given: $\triangle GKE$ is isosceles with base $\overline{GE}$, $\angle L$ and $\angle D$ are right angles, and K is the midpoint of $\overline{LD}$.

Prove: $\overline{LG} \cong \overline{DE}$



STATEMENTS	REASONS
ΔGKE is isosceles with base $\overline{GE}$ $\angle L$ and $\angle D$ are right angles K is the midpoint of $\overline{LD}$	Given
$\overline{KG} \cong \overline{KE}$	Def'n of Isosceles Δ
$\overline{LK} \cong \overline{KD}$	Midpoint Th'm
ΔGLK & ΔEDK are right Δs	Def'n of right Δ
$\Delta GLK \cong \Delta EDK$	HL Theorem
$\overline{LG} \cong \overline{DE}$	CPCTC

#30) Prove the isosceles triangle theorem.



Given: Triangle ABC is isosceles. Point D is the midpoint of $\overline{AC}$.

Prove: $\angle BAC \cong \angle BCA$

1) ΔABC is isosceles D is midpoint of $\overline{AC}$	Given
2) $\overline{AB} \cong \overline{BC}$	Def'n of isosceles Δ
3) $\overline{AD} \cong \overline{DC}$	Midpoint Th'm
4) $\overline{BD} \cong \overline{BD}$	Congruence of Segments is Reflexive
5) $\Delta ABD \cong \Delta CBD$	SSS $\cong$ Postulate
6) $\angle BAC \cong \angle BCA$	CPCTC