Unit 4 – Triangle Congruence

Congruent Triangles Review

Name: KEY

Date:_____ Class:_____

In problems 1-5, find the missing side, angle, or variable. Round answers to the nearest tenth if necessary. $\Delta ABC \cong \Delta DEF$

$50 = 10y + 10$
$40 = 10y$

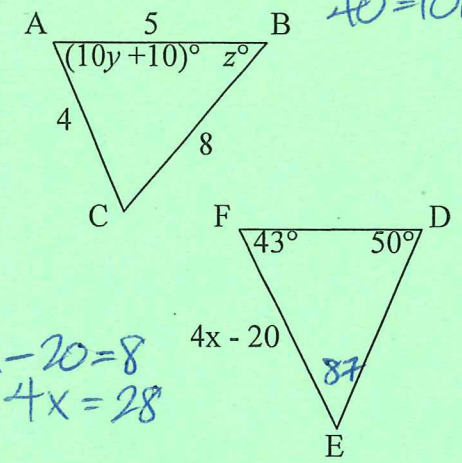
1. Find DE

2. Find $m\angle C$

3. Find x

4. Find y

5. Find z

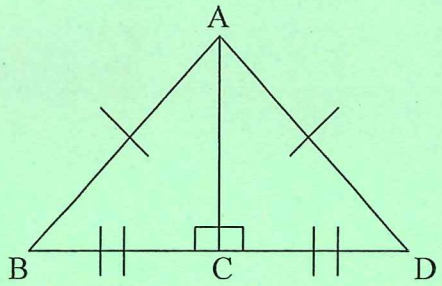


$4x - 20 = 8$
$4x = 28$

Answers:

1. DE = 5
2. m∠C = 43°
3. x = 7
4. y = 4
5. z = 87

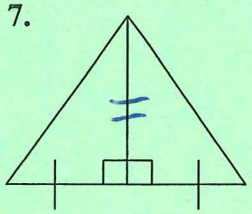
6. Write a congruence statement for the triangles below.



6. ΔACD ≅ Δ ACB

Decide whether enough information is given to show that the triangles are congruent. If so, state the postulate you would use.

7.



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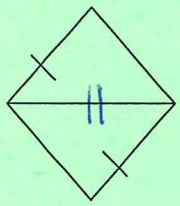

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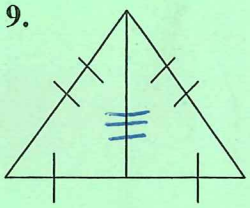

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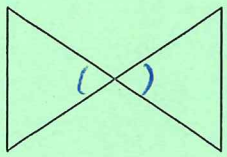
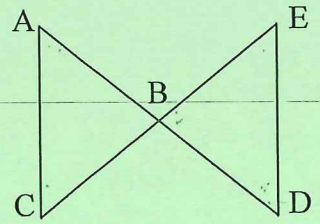


7. yes, SAS
8. no
9. yes, SSS
10. no

Tell which side is included between the given angles.



11. $\angle A$ and $\angle C$

12. $\angle D$ and $\angle EBD$

13. $\angle BED$ and $\angle DBE$

Answers:

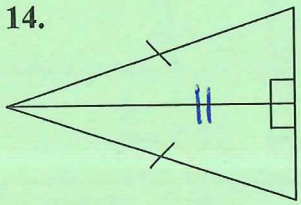
11. $\overline{AC}$

12. $\overline{BD}$

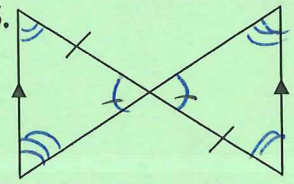
13. $\overline{BE}$

Tell whether enough information is given to show that the triangles are congruent. If so, state the postulate or theorem you would use.

14.



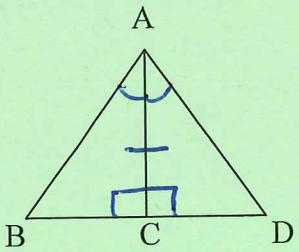
15.



14. yes, HL

15. yes, ASA or SAA

Complete the following proof.



Given: $\overline{AC} \perp \overline{BD}$; $\angle BAC \cong \angle DAC$

Prove: $\Delta ABC \cong \Delta ADC$

Statements	Reasons
A) $\overline{AC} \perp \overline{BD}$	16) given
17) _____	B) Def. of perpendicular
C) $\angle ACB \cong \angle ACD$	C) All right $\angle$'s are $\cong$
18) _____	D) Given
E) $\overline{AC} \cong \overline{AC}$	19) _____
F) $\Delta ABC \cong \Delta ADC$	20) _____

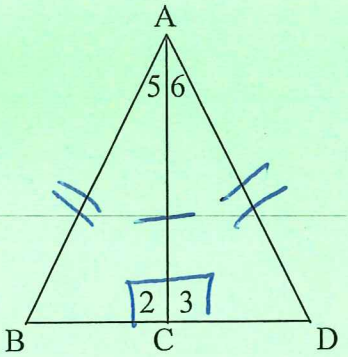
16. given

17. $\angle ACB$ + $\angle ACD$ are rt. $\angle$s

18. $\angle BAC \cong \angle DAC$

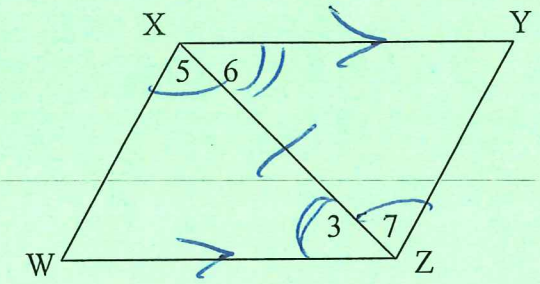
19. reflexive

20. ASA



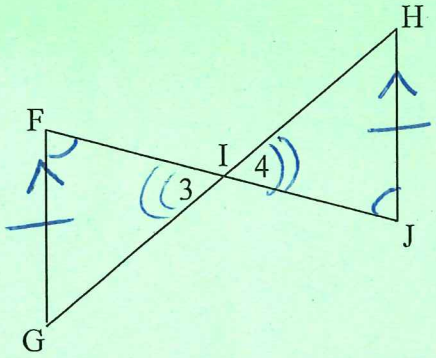
21. Given: AB ≅ AD & AC ⊥ BD
Prove: ΔABC ≅ ΔADC

Statements	Justifications
A. AB ≅ AD & AC ⊥ BD	A. given
B. ∠2 & ∠3 are Rt. ∠s	B. def. ⊥
C. $\overline{AC} = \overline{AC}$	C. Reflexive Property
D. ΔABC ≅ ΔADC	D. HL



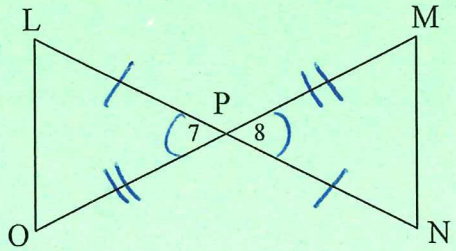
22. Given: XY || WZ & ∠5 ≅ ∠7
Prove: WX ≅ YZ

Statements	Justifications
A. XY // WZ & ∠5 ≅ ∠7	A. Given
B. XZ ≅ ZX	B. reflexive
C. ∠6 ≅ ∠3	C. Alt. Int. Angle Thrm.
D. ΔWXZ ≅ ΔYZX	D. ASA
E. $\overline{WX} \cong \overline{YZ}$	E. CPCTC



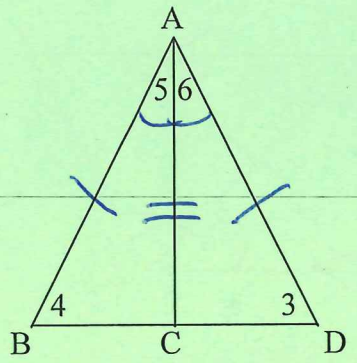
23. Given: FG ≅ HJ & FG || HJ
Prove: ΔFIG ≅ ΔJIH

Statements	Justifications
① FG ≅ HJ & FG // HJ	① Given
② ∠GFI ≅ ∠HJI	② AIA
③ ∠3 ≅ ∠4	③ Vert. ∠s ≅
④ ΔFIG ≅ ΔJIH	④ SAA (AAS)



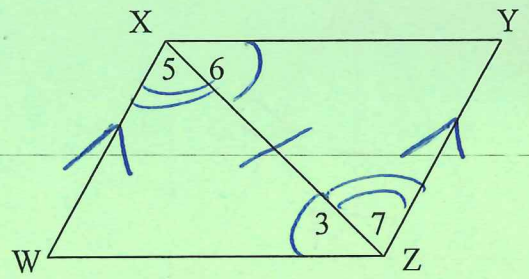
24. Given: P is the midpoint of OM & LN
Prove: LO ≅ NM

Statements	Justifications
① P is midpoint of OM & LN	① Given
② $\overline{LP} \cong \overline{PN}$, $\overline{OP} \cong \overline{PM}$	② Def. of midpoint
③ ∠7 ≅ ∠8	③ Vert. ∠s ≅
④ ΔLPO ≅ ΔNPM	④ SAS
⑤ $\overline{LO} \cong \overline{NM}$	⑤ CPCTC



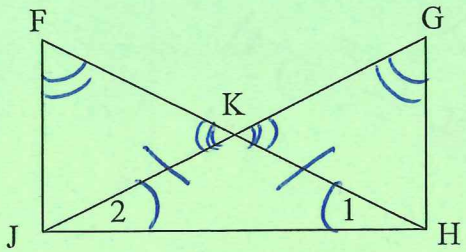
41. Given: $\angle 5 \cong \angle 6$ & $AB \cong AD$
Prove: $\Delta ABC \cong \Delta ADC$

Statements	Justifications
① $\angle 5 \cong \angle 6$ & $\overline{AB} \cong \overline{AD}$	① Given
② $\overline{AC} \cong \overline{AC}$	② Reflexive
③ $\Delta ABC \cong \Delta ADC$	③ SAS



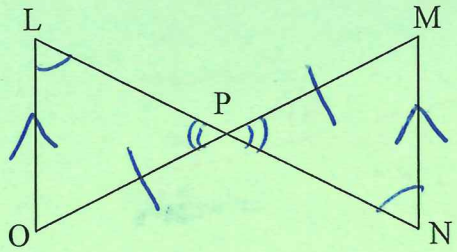
42. Given: $XW \parallel YZ$ & $\angle 6 \cong \angle 3$
Prove: $\Delta XYZ \cong \Delta ZWX$

Statements	Justifications
① $XW \parallel YZ$, $\angle 6 \cong \angle 3$	① Given
② $\overline{XZ} = \overline{XZ}$	② reflexive
③ $\angle 5 \cong \angle 7$	③ AIA th.
④ $\Delta XYZ \cong \Delta ZWX$	④ ASA



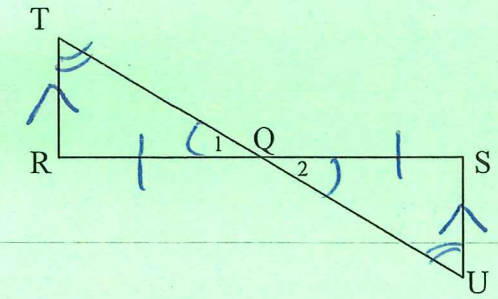
43. Given: $\angle 2 \cong \angle 1$ & $\angle F \cong \angle G$
Prove: $\Delta FJK \cong \Delta GHK$

Statements	Justifications
① $\angle 2 \cong \angle 1$ & $\angle F \cong \angle G$	① Given
② $\overline{FJ} \cong \overline{FH}$	② Isos. Δ th.
③ $\angle FKJ \cong \angle GKH$	③ Vert. $\angle$s $\cong$
④ $\Delta FJK \cong \Delta GHK$	④ SAA (AAS)



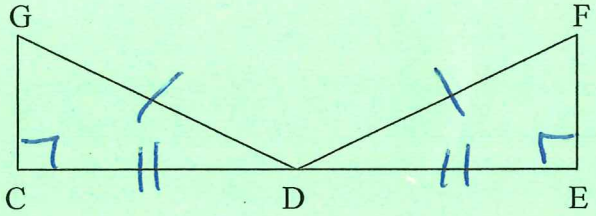
44. Given: P is the midpoint of OM & $LO \parallel MN$
Prove: $\Delta LOP \cong \Delta NMP$

Statements	Justifications
① P is midpoint of OM; $LO \parallel MN$	① Given
② $\overline{OP} \cong \overline{PM}$	② Defn. of midpoint
③ $\angle OLP \cong \angle MNP$	③ AIA th.
④ $\angle LPO \cong \angle MPN$	④ Vert. $\angle \cong$
⑤ $\Delta LOP \cong \Delta NMP$	⑤ SAA (AAS)



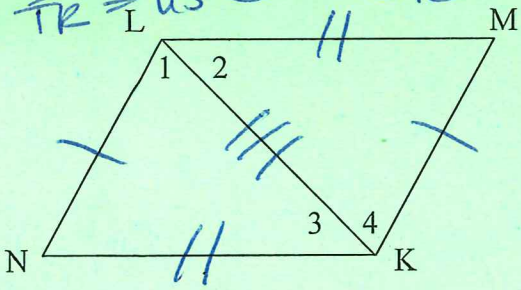
45. Given: Q is the midpoint of RS
TR ∥ SU
Prove: TR ≅ US

Statements	Justifications
① Q is midpoint of RS, TR // SU	① Given
② $\overline{RQ} \cong \overline{SQ}$	② Defn of midpoint
③ ∠1 ≅ ∠2	③ Vert. ∠s ≅
④ ∠T ≅ ∠U	④ AIA th
⑤ △TQR ≅ △UQS	⑤ SAA
⑥ $\overline{TR} \cong \overline{US}$	⑥ CPCTC



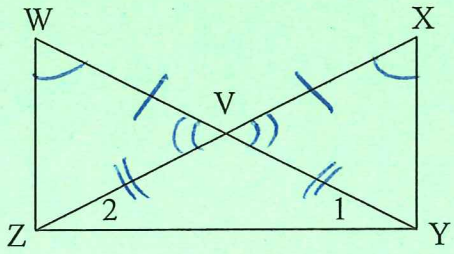
46. Given: FD ≅ GD, ∠C & ∠E are right ∠s
D is the midpoint of EC
Prove: FE ≅ GC

Statements	Justifications
① $\overline{FD} \cong \overline{GD}$, ∠C & ∠E are rt. ∠, D is mp of EC	① Given
② $\overline{CD} \cong \overline{ED}$	② Defn of midpoint
③ △CFD ≅ △FED	③ HL
④ $\overline{FE} \cong \overline{GC}$	④ CPCTC



47. Given: LN ≅ MK & LM ≅ KN
Prove: ∠N ≅ ∠M

Statements	Justifications
① $\overline{LN} \cong \overline{MK}$; $\overline{LM} \cong \overline{KN}$	① Given
② $\overline{LK} = \overline{LK}$	② reflexive
③ △LNK ≅ △KML	③ SSS
④ ∠N ≅ ∠M	④ CPCTC



48. Given: ∠W ≅ ∠X & WV ≅ XV
Prove: ∠1 ≅ ∠2

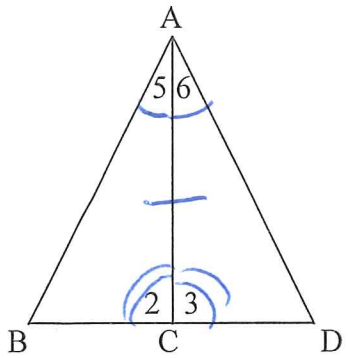
Statements	Justifications
① ∠W ≅ ∠X; $\overline{WV} \cong \overline{XV}$	① Given
② ∠WVZ ≅ ∠XVY	② Vert. ∠ ≅
③ △WVZ ≅ △XVY	③ ASA
④ $\overline{ZV} \cong \overline{VY}$	④ CPCTC
⑤ ∠1 ≅ ∠2	⑤ isos. △ th.

Chapter 4 – Triangle Congruence

Proving Parts of a Triangle are Congruent

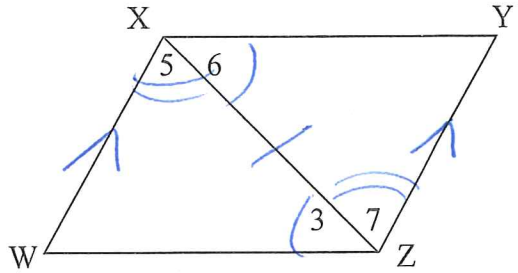
Name: KEY

Date:_____ Class:_____



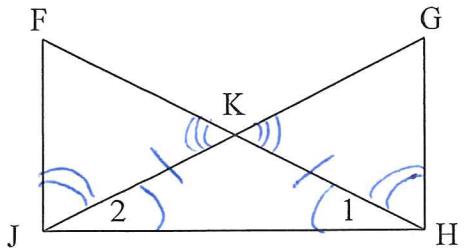
1. Given: $\angle 5 \cong \angle 6$ & $\angle 3 \cong \angle 2$
   Prove: $\angle B \cong \angle D$

Statements	Justifications
① $\angle 5 \cong \angle 6$ + $\angle 3 \cong \angle 2$	① Given
② $\overline{AC} \cong \overline{AC}$	② reflexive
③ $\triangle ABC \cong \triangle ADC$	③ ASA
④ $\angle B \cong \angle D$	④ CPCTC



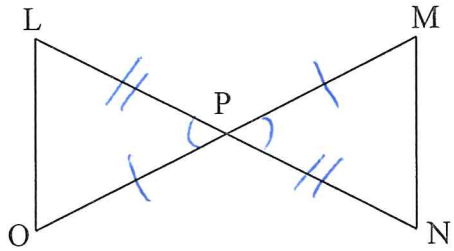
2. Given: XW || YZ & $\angle 3 \cong \angle 6$
   Prove: $WX \cong YZ$

Statements	Justifications
① XW//YZ + $\angle 3 \cong \angle 6$	① Given
② $\angle 5 \cong \angle 7$	② AIA th.
③ $\overline{XZ} \cong \overline{XZ}$	③ reflexive
④ $\triangle WXZ \cong \triangle YZX$	④ ASA
⑤ $\overline{WX} \cong \overline{YZ}$	⑤ CPCTC



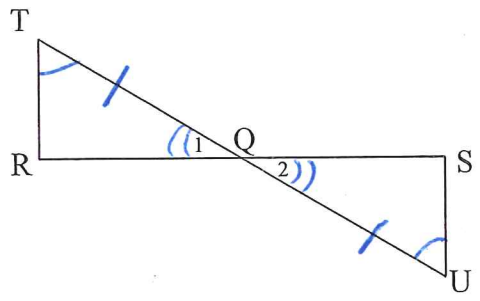
3. Given: $\angle 1 \cong \angle 2$ & $\angle FJK \cong \angle GHK$
   Prove: $KF \cong KG$

Statements	Justifications
① $\angle 1 \cong \angle 2$ + $\angle FJK \cong \angle GHK$	① Given
② $\overline{KJ} \cong \overline{KH}$	② Isos. $\triangle$ th.
③ $\angle FKJ \cong \angle GKH$	③ Vert. $\angle$s $\cong$
④ $\triangle FKJ \cong \triangle GKH$	④ ASA
⑤ $\overline{KF} \cong \overline{KG}$	⑤ CPCTC



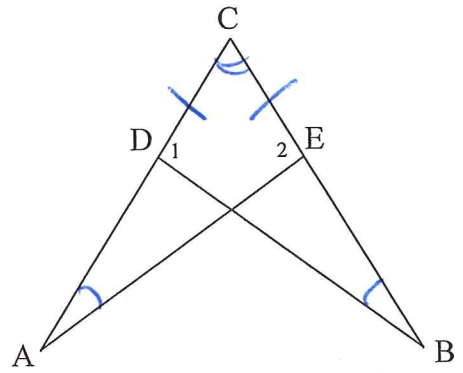
4. Given: P is the midpoint of OM & LN
   Prove: $\angle O \cong \angle M$

Statements	Justifications
① P is mp of OM & LN	① Given
② $\overline{OP} \cong \overline{PM}$, $\overline{LP} \cong \overline{PN}$	② Defn of midpoint
③ $\angle LPO \cong \angle NPM$	③ Vert. $\angle \cong$
④ $\triangle LPO \cong \triangle NPM$	④ SAS
⑤ $\angle O \cong \angle M$	⑤ CPCTC



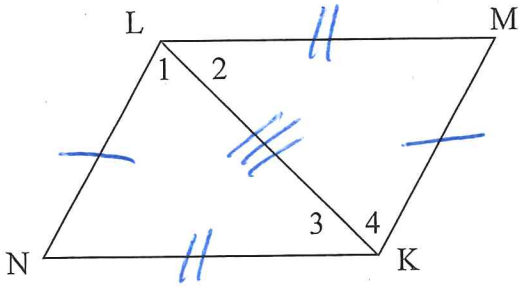
5. Given: TQ ≅ QU, ∠U ≅ ∠T
Prove: TR ≅ SU

Statements	Justifications
① $\overline{TQ} \cong \overline{QU}$; $\angle U \cong \angle T$	① Given
② $\angle 1 \cong \angle 2$	② Vert. ∠s ≅
③ $\triangle TRQ \cong \triangle USQ$	③ ASA
④ $\overline{TR} \cong \overline{SU}$	④ CPCTC



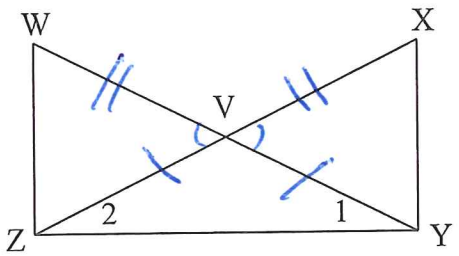
6. Given: CE ≅ CD & ∠A ≅ ∠B
Prove: DB ≅ EA

Statements	Justifications
① $\overline{CE} \cong \overline{CD}$; $\angle A \cong \angle B$	① Given
② $\angle C \cong \angle C$	② Reflexive
③ $\triangle ACE \cong \triangle BCD$	③ ASA
④ $\overline{DB} \cong \overline{EA}$	④ CPCTC



7. Given: LN ≅ MK & LM ≅ KN
Prove: ∠N ≅ ∠M

Statements	Justifications
① $\overline{LN} \cong \overline{MK}$; $\overline{LM} \cong \overline{KN}$	① Given
② $\overline{LK} \cong \overline{LK}$	② Reflexive
③ $\triangle LNK \cong \triangle KML$	③ SSS
④ $\angle N \cong \angle M$	④ CPCTC



8. Given: VZ ≅ VY & WV ≅ XV
Prove: ∠W ≅ ∠X

Statements	Justifications
① $\overline{VZ} \cong \overline{VY}$; $\overline{WV} \cong \overline{XV}$	① Given
② $\angle WVZ \cong \angle XVY$	② Vert. ∠ ≅
③ $\triangle WVZ \cong \triangle XVY$	③ SAS
④ $\angle W \cong \angle X$	④ CPCTC