

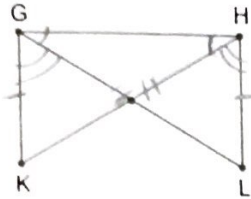
Math 2 – Honors
 Unit 6 – Triangles & Congruence
 Lesson 4 → More Triangle Congruence Proofs HOMEWORK

Name _____ Pd _____
 Date _____

1. Given: $\overline{GK} \cong \overline{HL}$

$\overline{GL} \cong \overline{HK}$

Prove: $\angle K \cong \angle L$

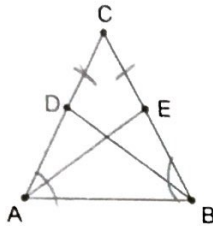


Statement	Reason
1. $\overline{GK} \cong \overline{HL}$	Given
2. $\overline{GL} \cong \overline{GL}$	Reflexive Prop \cong
3. $\triangle HGK \cong \triangle GHL$	SSS
4. $\angle K \cong \angle L$	CPCTC

2. Given: $\overline{AC} \cong \overline{BC}$

$\overline{CE} \cong \overline{CD}$

Prove: $\overline{AE} \cong \overline{BD}$



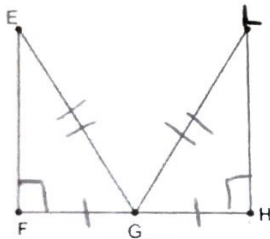
Statement	Reason
1. $\overline{AC} \cong \overline{BC}$	Given
2. $\angle C \cong \angle C$	Reflexive Prop \cong
3. $\triangle ACE \cong \triangle BCD$	SAS
4. $\overline{AE} \cong \overline{BD}$	CPCTC

3. Given: $\angle F$ and $\angle H$ are right angles

G is the midpoint of \overline{FH}

$\overline{EG} \cong \overline{LG}$

Prove: $\angle E \cong \angle L$



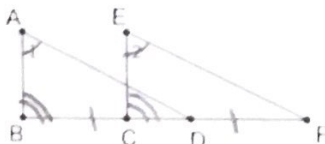
Statement	Reason
1. $\angle F$ and $\angle H$ are right angles	Given
2. $\angle F \cong \angle H$	Thm of Right \angle 's
3. $\overline{FG} \cong \overline{HG}$	Def of Midpoint
4. $\triangle EFG$ and $\triangle LHG$ right	Def of Right \triangle 's
5. $\triangle EFG \cong \triangle LHG$	HL \cong
6. $\angle E \cong \angle L$	CPCTC

4. Given: $\angle 1 \cong \angle 2$

$\angle B \cong \angle ECF$

$\overline{BD} \cong \overline{CF}$

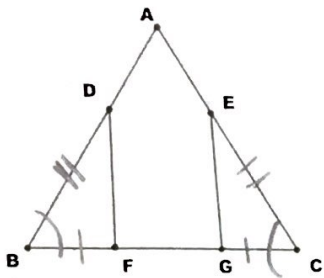
Prove: $\overline{AD} \cong \overline{EF}$



Statement	Reason
1. $\angle 1 \cong \angle 2$	Given
2. $\triangle ABD \cong \triangle ECF$	AAS \cong
3. $\overline{AD} \cong \overline{EF}$	CPCTC

5. Given: $\angle B \cong \angle C$
 $\overline{BF} \cong \overline{GC}$
 $\overline{BD} \cong \overline{EC}$

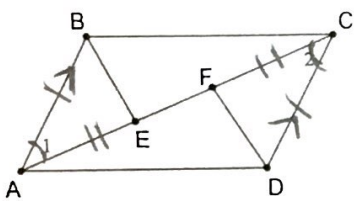
Prove: $\angle BDF \cong \angle CEG$



Statement	Reason
1.	Given
2. $\triangle BDF \cong \triangle CEG$	SAS \cong
3. $\angle BDF \cong \angle CEG$	CPCTC

6. Given: $\overline{AB} \cong \overline{CD}$
 $\overline{AB} \parallel \overline{CD}$
 $\overline{AE} \cong \overline{CF}$

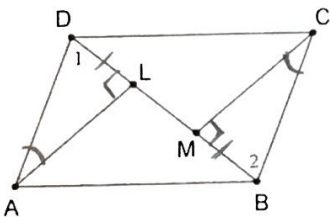
Prove: $\overline{BE} \cong \overline{DF}$



Statement	Reason
1.	Given
2. $\angle 1 \cong \angle 2$	Alt int \angle 's \cong
3. $\triangle ABE \cong \triangle CDF$	SAS \cong
4. $\overline{BE} \cong \overline{DF}$	CPCTC

7. Given: $\angle DAL \cong \angle BCM$
 $\overline{DL} \cong \overline{MB}$
 $\angle ALD$ and $\angle CMB$ are right angles

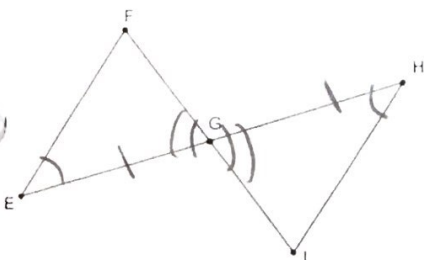
Prove: $\overline{AL} \cong \overline{CM}$



Statement	Reason
1.	Given
2. $\angle ALD \cong \angle CMB$	Thm Right \angle 's
3. $\triangle ALD \cong \triangle CMB$	AAS \cong
4. $\overline{AL} \cong \overline{CM}$	CPCTC

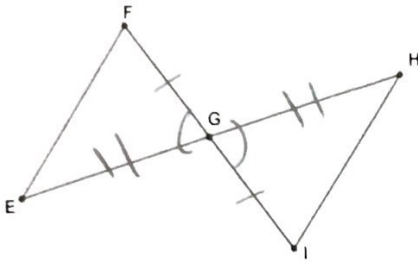
8. Given: \overline{FI} bisects \overline{EH}
 $\angle E \cong \angle H$

Prove: $\overline{EF} \cong \overline{HI}$



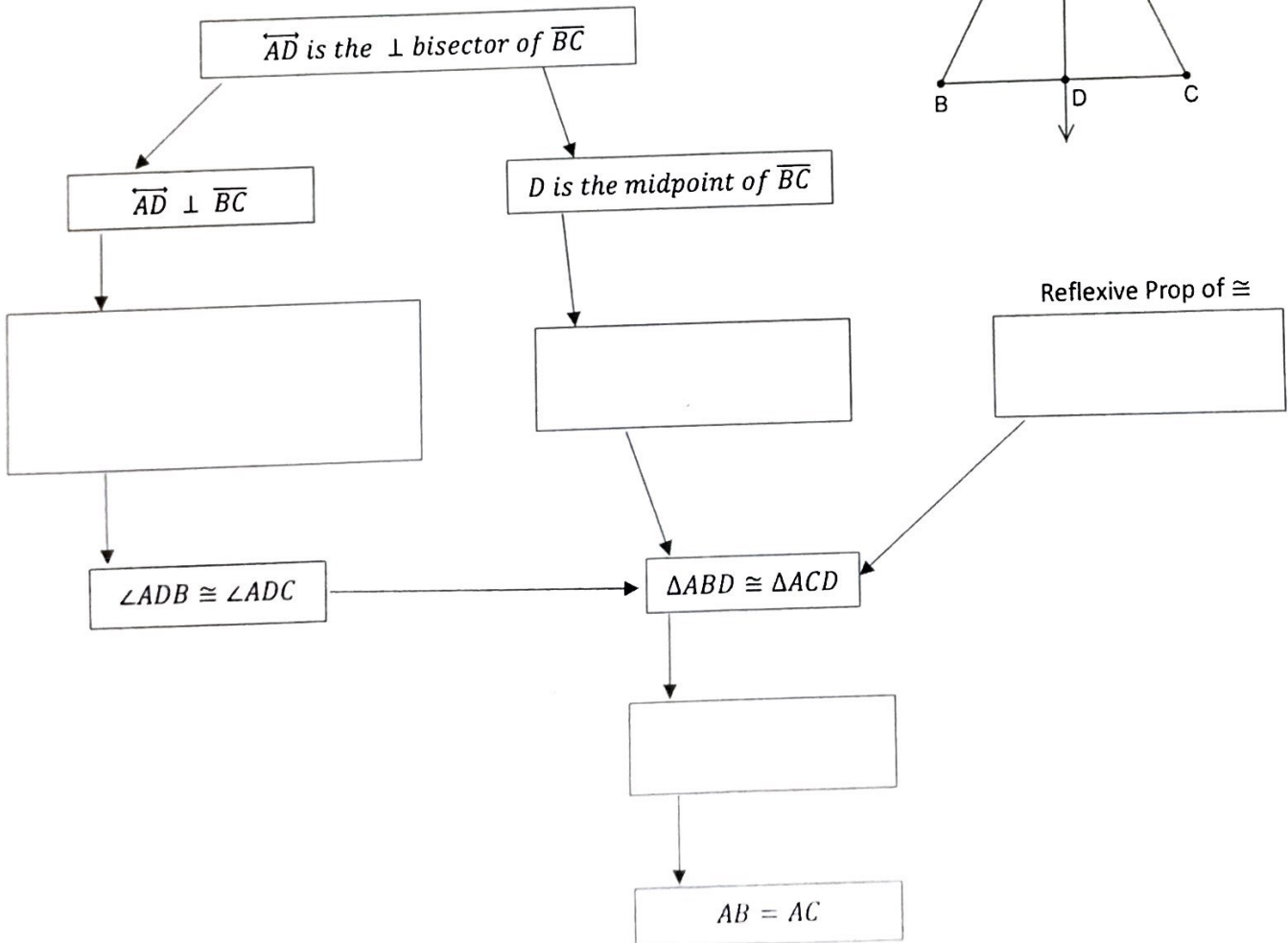
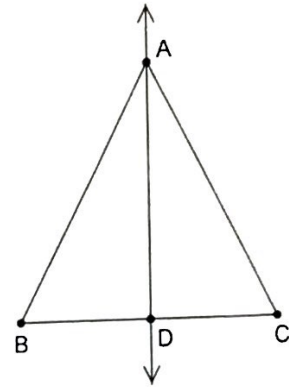
Statement	Reason
1. G is midpoint of EH	Given
2. $\overline{EG} \cong \overline{GI}$	Def of Midpoint
3. $\angle FGE \cong \angle IGH$	Vert \angle 's \cong
4. $\triangle FGE \cong \triangle IGH$	ASA \cong
5. $\overline{EF} \cong \overline{HI}$	CPCTC
6.	

9. Given: \overline{FI} and \overline{HE} bisect each other
 Prove: $\angle E \cong \angle H$

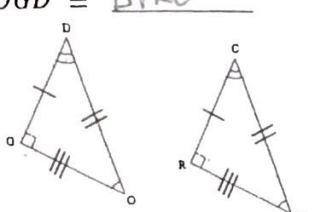
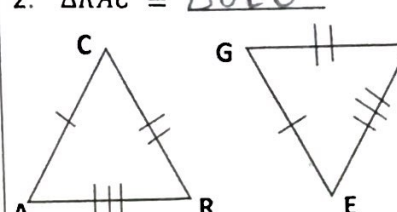
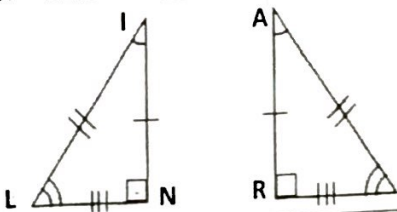


Statement	Reason
1.	Given
2. $\overline{FG} \cong \overline{IG}$	Def of seg bisector
3. $\overline{EG} \cong \overline{HG}$	
4. $\angle FGE \cong \angle IGH$	vert \angle 's \cong
5. $\triangle FGE \cong \triangle IGH$	SAS \triangle
6. $\angle E \cong \angle H$	CPCCTC

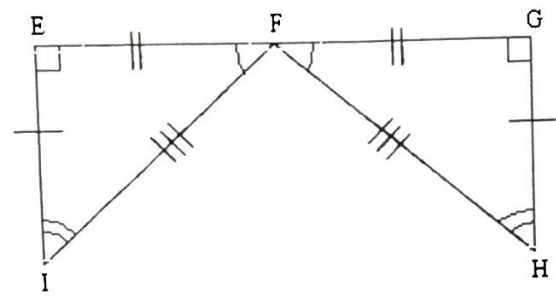
10. Given: \overline{AD} is the \perp bisector of \overline{BC}
 Prove: $AB = AC$



➤ Name the congruent triangles.

1. $\triangle OGD \cong \triangle PRC$ 	2. $\triangle RAC \cong \triangle OEG$ 	3. $\triangle LIN \cong \triangle EAR$ 
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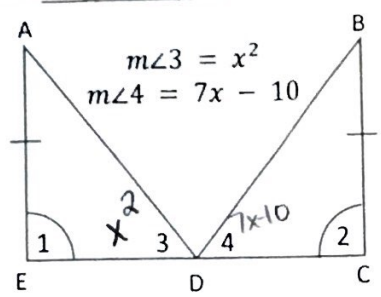
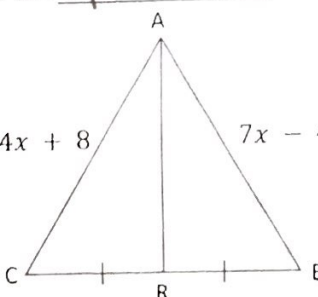
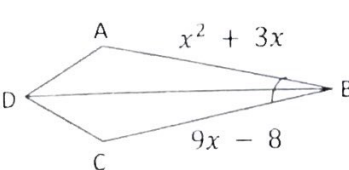
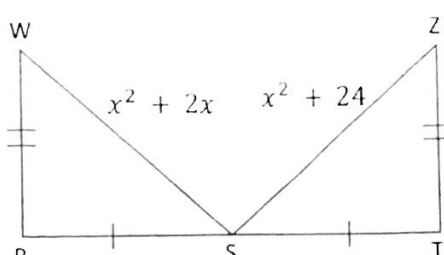
➤ Name the congruent triangle and the congruent parts.

4. 	$\triangle FGH \cong \triangle FEI$ $\angle EFI \cong \angle GFH$ $\overline{FG} \cong \overline{FE}$ $\angle G \cong \angle E$ $\overline{GH} \cong \overline{EI}$ $\angle H \cong \angle I$ $\overline{FH} \cong \overline{FI}$
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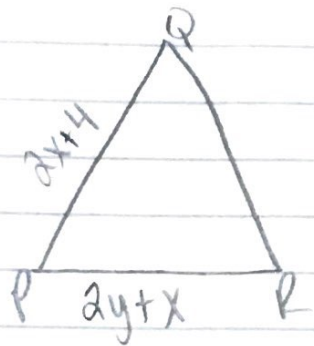
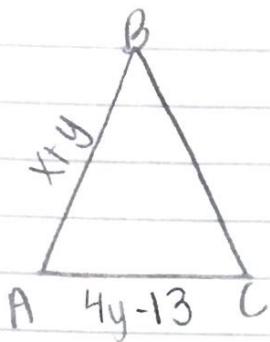
➤ Use the congruency statement to fill in the corresponding congruent parts.

5. $\triangle EFI \cong \triangle HGI$	$\angle E \cong \angle H$	$\overline{FE} \cong \overline{GH}$	$\angle EFI \cong \angle HGI$
	$\overline{FI} \cong \overline{GI}$	$\angle FIE \cong \angle GIH$	$\overline{IE} \cong \overline{IH}$

➤ Solve each set of congruent triangles for the information indicated.

6. $\triangle ABC \cong \triangle PQR$. $PQ = 14$ <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> $AB = x + y$ $PQ = 2x + 4$ $AC = 4y - 13$ $PR = 2y + x$ </div>	7. $\triangle LMN \cong \triangle XYZ$. $m\angle X = 114^\circ$ <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> $m\angle L = x^2 + 50$ $m\angle N = 40$ $m\angle Y = -2x + 10$ </div>	8. $x = 5$ or 2 
9. $x = 4$ 	10. $x = 4$ or 2 	11. $x = 12$ 

6)



$$x+y = 2x+4 \Rightarrow (x+y=4)$$

$$4y-13 = 2y+x \Rightarrow -x+2y=13$$

$$x-y = -4$$

$$-x+2y = 13$$

$$y = 9$$

$$x+(9) = 2x+4$$

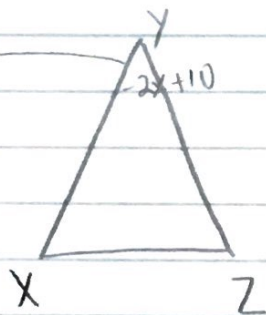
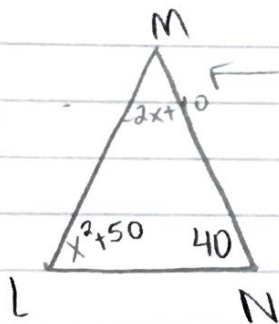
$$x+9 = 2x+4$$

$$-x -4 -x -4$$

$$5 = x$$

$$PQ = 2(5)+4 = 14$$

7)



$$-2x+10 + x^2+50 + 40 = 180$$

$$x^2 - 2x + 100 = 180$$

$$-180 \quad -180$$

$$x^2 - 2x - 80 = 0$$

$$(x-10)(x+8) = 0$$

$$x=10 \quad x=-8$$

$$(-8)^2 + 50 = 114^\circ$$

8)

$$x^2 = 7x - 10$$

$$x^2 - 7x + 10 = 0$$

$$(x-5)(x-2) = 0$$

$$x=5 \quad x=2$$

10)

$$x^2 + 3x = 9x - 8$$

$$x^2 - 6x + 8 = 0$$

$$(x-4)(x-2) = 0$$

$$x=4 \quad x=2$$

9)

$$4x + 8 = 7x - 4$$

$$-4x + 4 -4x + 4$$

$$12 = 3x$$

$$x = 4$$

11)

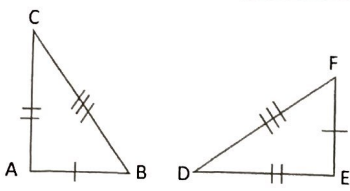
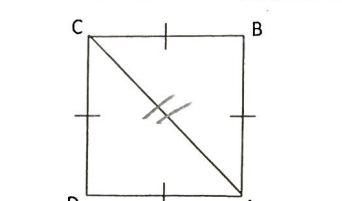
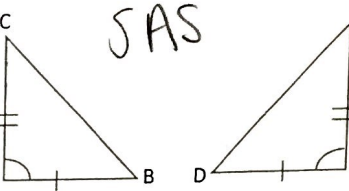
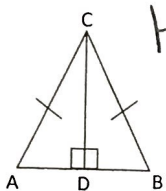
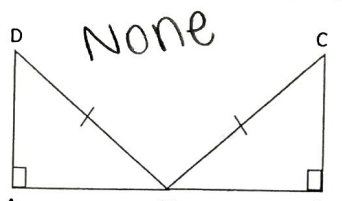
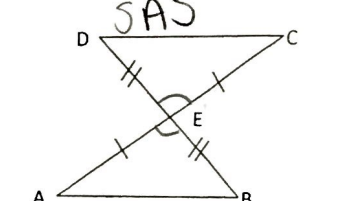
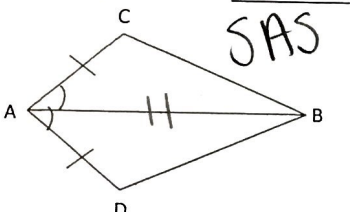
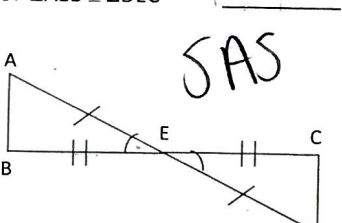
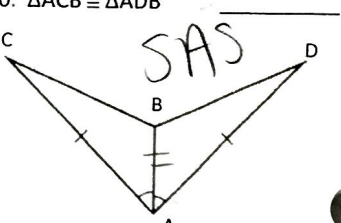
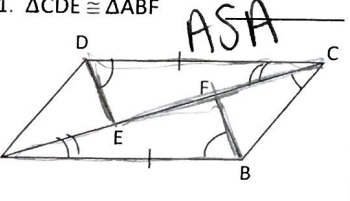
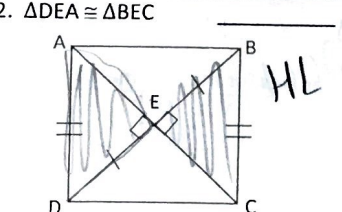
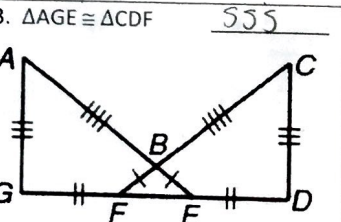
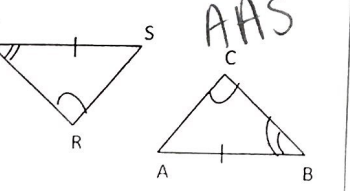
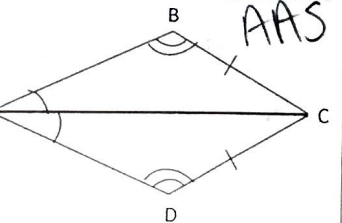
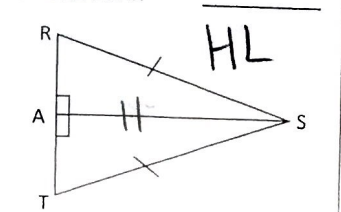
$$x^2 + 2x = x^2 + 24$$

$$-x^2 \quad -x^2$$

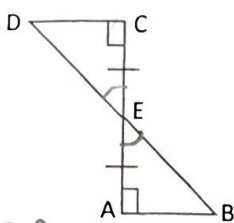
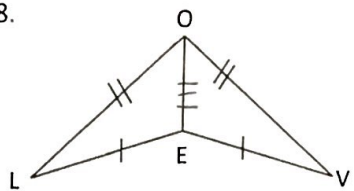
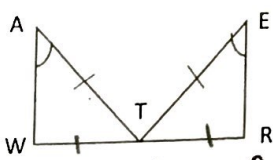
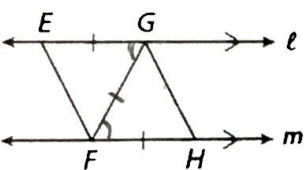
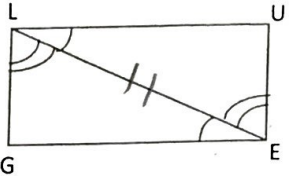
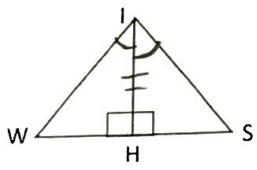
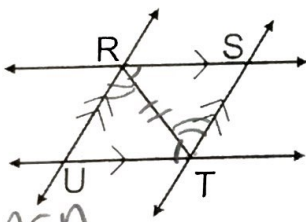
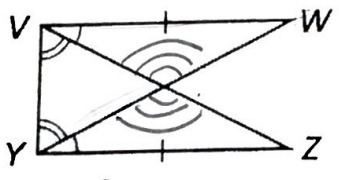
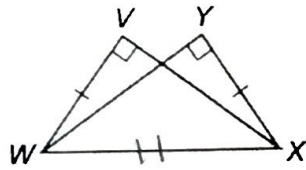
$$2x = 24$$

$$x = 12$$

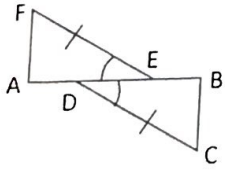
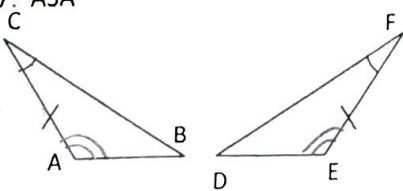
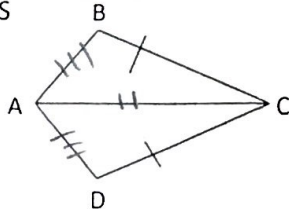
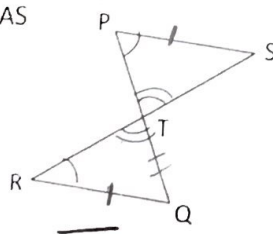
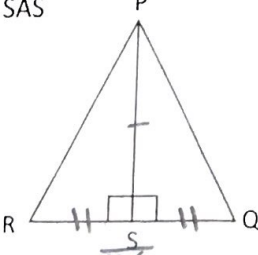
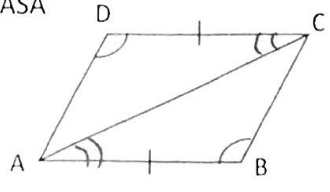
➤ For each pair of triangle, tell which congruence rule, if any, make the triangles congruent.

<p>12. $\triangle ABC \cong \triangle FED$ <u>SSS</u></p> 	<p>13. $\triangle ABC \cong \triangle CDA$ <u>SSS</u></p> 	<p>14. $\triangle ABC \cong \triangle EDF$ <u>SAS</u></p> 
<p>15. $\triangle ADC \cong \triangle BDC$ <u>HL</u></p> 	<p>16. $\triangle MAD \cong \triangle MBC$ <u>None</u></p> 	<p>17. $\triangle ABE \cong \triangle CDE$ <u>SAS</u></p> 
<p>18. $\triangle ACB \cong \triangle ADB$ <u>SAS</u></p> 	<p>19. $\triangle AEB \cong \triangle DEC$ <u>SAS</u></p> 	<p>20. $\triangle ACB \cong \triangle ADB$ <u>SAS</u></p> 
<p>21. $\triangle CDE \cong \triangle ABF$ <u>ASA</u></p> 	<p>22. $\triangle DEA \cong \triangle BEC$ <u>HL</u></p> 	<p>23. $\triangle AGE \cong \triangle CDF$ <u>SSS</u></p> 
<p>24. $\triangle RTS \cong \triangle CBA$ <u>AAS</u></p> 	<p>25. $\triangle ABC \cong \triangle ADC$ <u>AAS</u></p> 	<p>26. $\triangle SAT \cong \triangle SAR$ <u>HL</u></p> 

For each pair of triangles, (a) State the congruence rule that makes them congruent (b) Write the triangle congruency statement. If the triangles are not congruent, leave the statement blank.

<p>27. </p> <p>a. <u>ASA</u> b. $\triangle ABE \cong \triangle$ <u>CDE</u></p>	<p>28. </p> <p>a. <u>SSS</u> b. $\triangle LEO \cong \triangle$ <u>VEO</u></p>	<p>29. Given: T is the midpoint of \overline{WR}</p>  <p>a. <u>None</u> b. $\triangle TAW \cong \triangle$ _____</p>
<p>30. </p> <p>a. <u>SAS</u> b. $\triangle EGF \cong \triangle$ <u>HFG</u></p>	<p>31. </p> <p>a. <u>ASA</u> b. $\triangle LEG \cong \triangle$ <u>ELU</u></p>	<p>32. Given: \overline{IH} bisects $\angle WIS$</p>  <p>a. <u>ASA</u> b. $\triangle WIH \cong \triangle$ <u>SIH</u></p>
<p>33. </p> <p>a. <u>ASA</u> b. $\triangle RUT \cong \triangle$ <u>TSR</u></p>	<p>34. </p> <p>a. <u>AAS</u> b. $\triangle WVY \cong \triangle$ <u>ZYV</u></p>	<p>35. </p> <p>a. <u>HL</u> b. $\triangle WVX \cong \triangle$ <u>XYW</u></p>

Using the given congruence rule, tell which parts of the pair of triangles should be shown congruent.

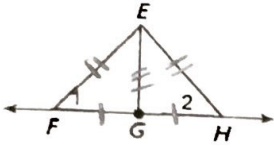
<p>36. SAS </p> <p><u>EA</u> \cong <u>DB</u></p>	<p>37. ASA </p> <p><u>∠A</u> \cong <u>∠E</u></p>	<p>38. SSS </p> <p><u>AB</u> \cong <u>AD</u></p>
<p>39. AAS </p> <p><u>PQ</u> \cong <u>SP</u></p>	<p>40. SAS </p> <p><u>PS</u> \cong <u>QS</u></p>	<p>41. ASA </p> <p><u>∠OCA</u> \cong <u>∠BAC</u></p>

QT \cong PT

➤ For each problem below, write a two-column proof.

42. Given: G is the midpoint of \overline{FH} .
 $\overline{EF} \cong \overline{EH}$

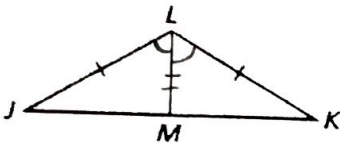
Prove: $\angle 1 \cong \angle 2$



$\angle 1 \cong \angle 2$ By JTT

Statement	Reason
1.	Given
2. $\overline{FG} \cong \overline{HG}$	Def of Midpoint
3. $\overline{EG} \cong \overline{EG}$	Reflexive Prop \cong
4. $\triangle FEG \cong \triangle HEG$	SSS \cong
5. $\angle 1 \cong \angle 2$	CPCTC

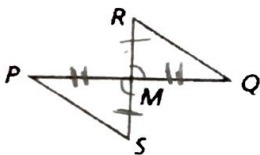
43. Given: \overline{LM} bisects $\angle JLK$. $\overline{JL} \cong \overline{KL}$
 Prove: M is the midpoint of \overline{JK} .



Statement	Reason
1.	Given
2. $\angle JLM \cong \angle KLM$	Def of bisector
3. $\overline{LM} \cong \overline{LM}$	Reflexive Prop \cong
4. $\triangle JLM \cong \triangle KLM$	SAS \cong
5. $\overline{JM} \cong \overline{KM}$	CPCTC
6. M is midpoint	Def of midpoint

44. Given: M is the midpoint of \overline{PQ} and \overline{RS} .

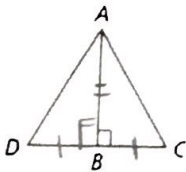
Prove: $\overline{QR} \cong \overline{PS}$



Statement	Reason
1.	Given
2. $\overline{PM} \cong \overline{QM}$, $\overline{RM} \cong \overline{SM}$	Def of midpoint
3. $\angle PMS \cong \angle QMR$	Vertical \angle 's \cong
4. $\triangle PMS \cong \triangle QMR$	SAS \cong
5. $\overline{QR} \cong \overline{PS}$	CPCTC
6.	

45. Given: B is the midpoint of \overline{DC} . $\overline{AB} \perp \overline{DC}$

Prove: $\triangle ABD \cong \triangle ABC$



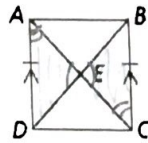
Statement	Reason
1.	Given
2. $\overline{DB} \cong \overline{CB}$	Def of Midpoint
3. $\angle DBA$ and $\angle CBA$ are right	Def of \perp lines
4. $\angle DBA \cong \angle CBA$	Theorem of Right \angle 's
5. $\overline{AB} \cong \overline{AB}$	Reflexive Prop \cong
6. $\triangle ABD \cong \triangle ABC$	SAS \cong

➤ For each problem below, write a two-column proof.

46. Use AAS to prove the triangles congruent.

Given: $\overline{AD} \parallel \overline{BC}$, $\overline{AD} \cong \overline{CB}$

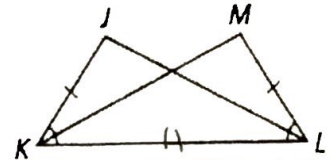
Prove: $\triangle AED \cong \triangle CEB$



Statement	Reason
1.	Given
2. $\angle AED \cong \angle BEC$	Vertical \angle 's \cong
3. $\angle DAE \cong \angle BCE$	Alt int \angle 's \cong
4. $\triangle AED \cong \triangle CEB$	AAS \cong

49. Given: $\overline{JK} \cong \overline{ML}$, $\angle JKL \cong \angle MLK$

Prove: $\triangle JKL \cong \triangle MLK$

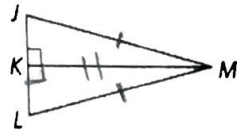


Statement	Reason
1.	Given
2. $\overline{KL} \cong \overline{KL}$	Reflexive Prop \cong
3. $\triangle JKL \cong \triangle MLK$	SAS \cong

47.

Given: $\overline{KM} \perp \overline{JL}$, $\overline{JM} \cong \overline{LM}$

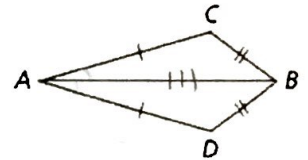
Prove: $\triangle JKM \cong \triangle LKM$



Statement	Reason
1.	Given
2. $\angle JKM + \angle LKM$ are right	Def of \perp lines
3. $\angle JKM + \angle LKM$ are right	Def of Right Δ 's
4. $\overline{KM} \cong \overline{KM}$	Reflexive Prop of \cong
5. $\triangle JKM \cong \triangle LKM$	HL \cong

50. Given: $\overline{AC} \cong \overline{AD}$, $\overline{CB} \cong \overline{DB}$

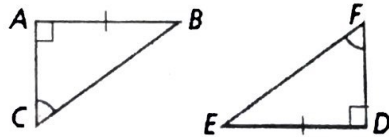
Prove: \overline{AB} bisects $\angle CAD$.



Statement	Reason
1.	Given
2. $\overline{AB} \cong \overline{AB}$	Reflexive Prop of \cong
3. $\triangle ACB \cong \triangle ADB$	SSS \cong
4. $\angle CAB \cong \angle DAB$	CPCTC
5. \overline{AB} bisects $\angle CAD$	Def of \angle bisector

48. Given: $\overline{AB} \cong \overline{DE}$, $\angle C \cong \angle F$

Prove: $\triangle ABC \cong \triangle DEF$



Statement	Reason
1.	Given
2. $\angle A \cong \angle D$	All right \angle 's \cong
3. $\triangle ABC \cong \triangle DEF$	AAS