Name | *3: Congruent Triangles* | Ms. Kresovic

Adv Geo - 3.2 Date:

What are the 5 purpose of proof?

1. VERIFY THE TRUTH OF A MATHEMATICAL STATEMENT.
2. EXPLAIN WHY THE STATEMENT IS TRUE
3. COMMUNICATE OUR MATH. KNOWLEDGE
4. DISCOVER NEW MATH
5. CREATE AXIOMATIC SYSTEM

What are the three postulates that prove triangles congruent?

LEVELS OF REASONING

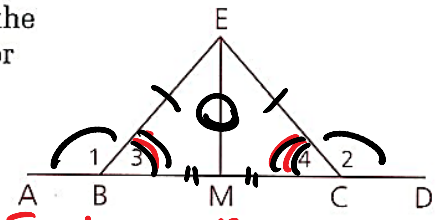
1. EXTERNAL
2. EMPERICAL
3. ANALYTIC

Sample Problems

20 Study the problem below, then copy the flow diagram and fill in the reason for each statement.

Given: $\angle 1 \cong \angle 2$;
M is the midpt. of $\overline{BC}$.
$\overline{BE} \cong \overline{CE}$

Prove: $\triangle EMB \cong \triangle EMC$



SSS
~~SAS~~
ASA

MAP

Statements

		Reasons
1	$\angle 1 \cong \angle 2$	1
2	$\angle 1$ supp. $\angle 3$	2
2	$\angle 2$ supp. $\angle 4$	2
1	M is the midpoint of $\overline{BC}$.	4
1	$\overline{BE} \cong \overline{CE}$	S
3	$\angle 3 \cong \angle 4$	A
4	$\overline{MB} \cong \overline{MC}$	S
5	$\triangle EMB \cong \triangle EMC$	8

Reasons
1. GIVEN
2. Stl → suppLs
3. Ls supp ≅ Ls ⇒ ≅ Ls
4. midpt ⇒ ≅ segs
5. SAS

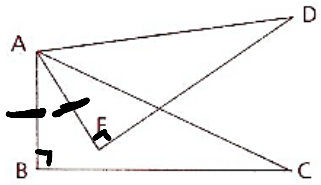
21 In problem 20, what given information is not needed to prove the triangles congruent?

$\angle 1 \cong \angle 2$ ∴ $\overline{EM} \cong \overline{EM}$ (Ref) then SSS.

Problem Set C

26 Given: $\overline{AB} \cong \overline{AE}$;
$\overrightarrow{AE}$ and $\overrightarrow{AC}$ trisect $\angle BAD$.
$\overline{AB} \perp \overline{BC}$,
$\overline{AE} \perp \overline{DE}$

Conclusion: $\triangle ABC \cong \triangle AED$



AB = AE

$\overrightarrow{AE}$ + $\overrightarrow{AC}$ trisect ∠BAD

AB ⊥ BC
AE ⊥ DE
⊥ ⇒ rt∠s
rt∠ ⇒ ≅∠s

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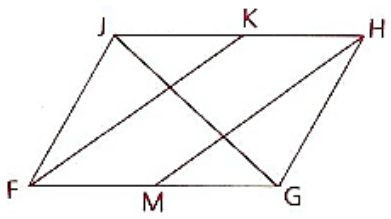
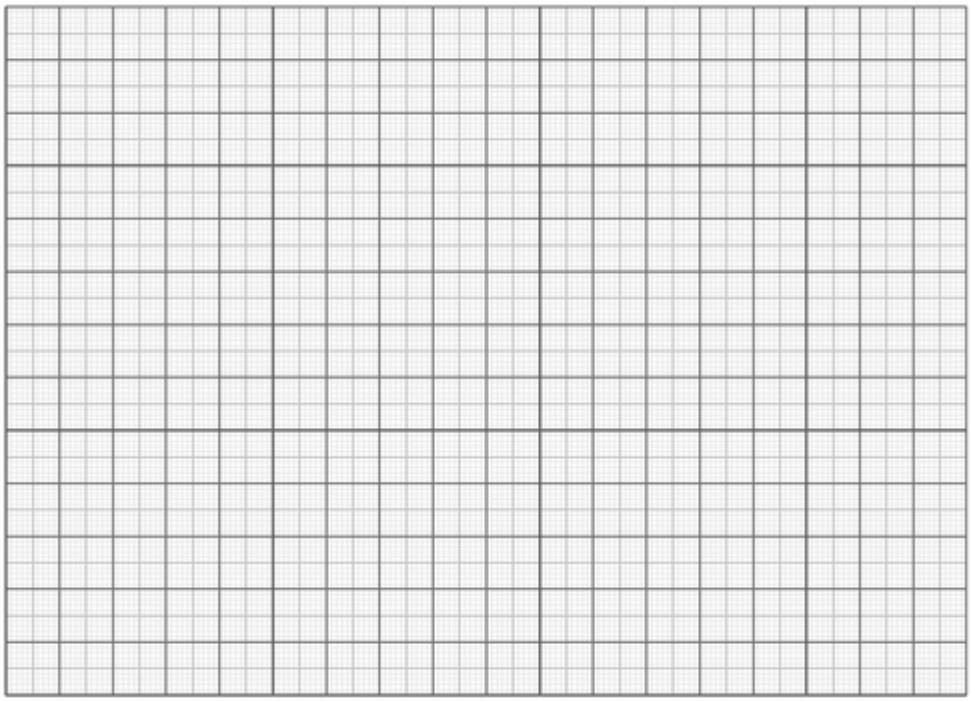
Statements	Reasons
1. $\overline{AB} \perp BC$, $\overline{AE} \perp DE$	1. Given
2. ∠ABC & ∠AED are rt∠	2. ⊥ ⇒ rt∠
3. ∠ABC ≅ ∠AED	3. rt∠s ⇒ ≅∠s
4. $\overline{AB} \cong \overline{AE}$	4. Given
5. $\overrightarrow{AE}$ & $\overrightarrow{AC}$ trisect ∠BAD	5. Given

27 Given: $\overline{JH} \cong \overline{FG}$;
K and M are midpoints.
$\angle HKF \cong \angle FMH$,
$\angle KJG \cong \angle MGJ$,
$\angle JGH \cong \angle FJG$
Conclusion: $\triangle FJK \cong \triangle HGM$

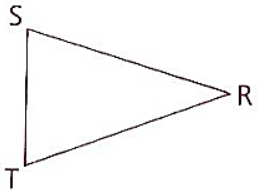


28 Consider two triangles, $\triangle ABC$ and $\triangle FDE$, with vertices $A = (0, 7)$, $B = (-4, 0)$, $C = (0, 0)$, $D = (2, 3)$, $E = (2, -1)$, and $F = (9, -1)$. Draw a diagram and explain why $\triangle ABC \cong \triangle FDE$.



22 Given: $\overline{RS} \cong \overline{RT}$

Conclusion: $\triangle RST \cong \triangle RTS$

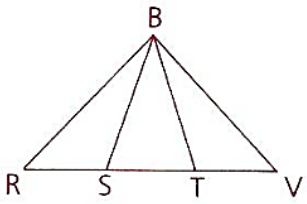


23 Given: S and T trisect $\overline{RV}$

$\angle R \cong \angle V$

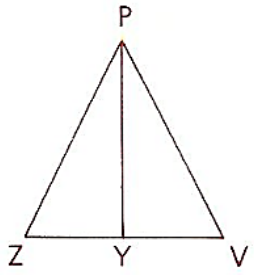
$\angle BST \cong \angle BTS$

Conclusion: $\triangle BRS \cong \triangle BVT$



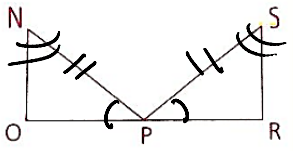
24 Given: $\overrightarrow{PY}$ bisects $\angle VPZ$,
$\angle VPY = (2x + 7)°$,
$\angle ZPY = (3x - 9)°$,
$PZ = \frac{1}{2}x + 5$,
$PV = x - 3$

Prove: $\triangle VPY \cong \triangle ZPY$
(Use a paragraph proof.)



Homework

11 Given: ∠N is comp. to ∠NPO.
∠S is comp. to ∠SPR.
∠NPO ≅ ∠SPR,
$\overline{NP} \cong \overline{SP}$
Conclusion: △NOP ≅ △SRP



Q+A 10/6

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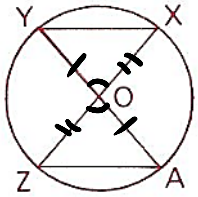
ASA

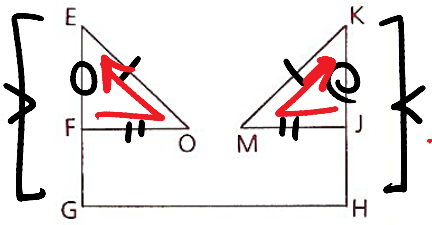
A 1. ∠NPO ≅ ∠SPR — 1. Given
S 2. $\overline{NP} \cong \overline{SP}$ — 2. Given
3. ∠N comp ∠NPO, ∠S comp ∠SPR — 3. Given
A 4. ∠N ≅ ∠S — 4. ∠s comp to ≅∠s ⇒ ≅∠s
5. △NOP ≅ △SRP — 5. ASA (1,2,4)

12 Given: O is the midpt. of $\overline{AY}$.
O is the midpt. of $\overline{ZX}$.
Conclusion: △ZOA ≅ △XOY



1. O mdpt $\overline{AY}$ — 1. Given
S 2. $\overline{YO} \cong \overline{AO}$ — 2. mdpt ⇒ ≅ segs (1)
A 3. ∠YOX ≅ ∠AOZ — 3. Vert ∠s ⇒ ≅∠s
4. O mdpt $\overline{ZX}$ — 4. Given
S 5. $\overline{ZO} \cong \overline{OX}$ — 5. mdpt ⇒ ≅ segs (4)
6. △ZOA ≅ △XOY — 6. SAS (2 3 4)

13 Given: $\overline{EO} \cong \overline{KM}$,
$\overline{FO} \cong \overline{JM}$,
$\overline{EG} \cong \overline{KH}$;
F is the midpt. of $\overline{EG}$.
J is the midpt. of $\overline{KH}$.
Conclusion: $\triangle EFO \cong \triangle KJM$



EG = KH
Fmdpt
Jmdpt

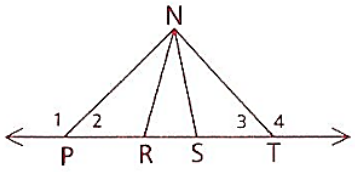
EF = KJ
(÷)

FO = JM EO = KM

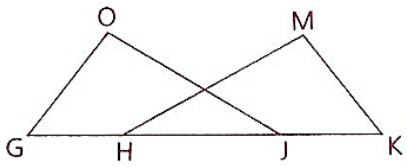
SSS
SAS
ASA

Statements	Reasons
1. $\overline{EG} = \overline{KH}$, F mdpt EG, J mdpt KH	1. Given
S 2. $\overline{EF} \cong \overline{KJ}$	2. Division (1)
S 3. $\overline{EO} \cong \overline{KM}$	3. Given
S 4. $\overline{FO} \cong \overline{JM}$	4. Given
5. $\triangle FOE \cong \triangle JMK$	5. SSS (2 3 4)

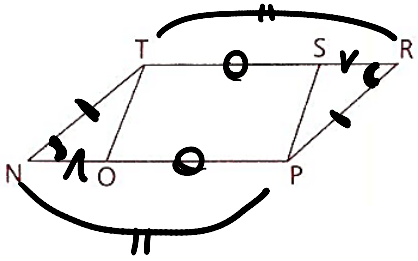
14 Given: $\angle 1 \cong \angle 4$,
$\overline{PR} \cong \overline{TS}$,
$\overline{NP} \cong \overline{NT}$
Prove: $\triangle NPR \cong \triangle NTS$



15 Given: $\overline{GH} \cong \overline{KJ}$,
$\overline{HM} \cong \overline{JO}$,
$\overline{GO} \cong \overline{KM}$
Prove: $\triangle GOJ \cong \triangle KMH$



16 Given: $\angle R \cong \angle N$,
$\overline{RP} \cong \overline{NT}$,
$\overline{RT} \cong \overline{NP}$,
$\overline{TS} \cong \overline{OP}$
Conclusion: $\triangle NOT \cong \triangle RSP$



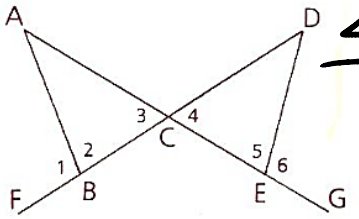
S. $\overline{RP} = \overline{NT}$ A $\angle R = \angle N$ 1 S $\overline{RT} = \overline{NP}$
2 $\overline{TS} = \overline{OP}$
3 $\overline{SR} = \overline{ON}$

1. $\overline{RT} \cong \overline{NP}$	1. GIVEN
2. $\overline{TS} \cong \overline{OP}$	2. GIVEN
S 3. $\overline{SR} \cong \overline{ON}$	3. SUBTRACT (1, 2)
A 4. $\angle R \cong \angle N$	4. GIVEN
S 5. $\overline{RP} \cong \overline{NT}$	5. GIVEN
6. $\triangle RSP \cong \triangle NOT$	6. SAS (3, 4, 5)

AMDG

17 Given: $\angle 1 \cong \angle 6$, $\overline{BC} \cong \overline{EC}$

Conclusion: $\triangle ABC \cong \triangle DEC$



$\angle 1 = \angle 6$

$\angle 1$ comp $\angle 2$

$\angle 5$ c $\angle 6$

$\angle 2 = \angle 5$

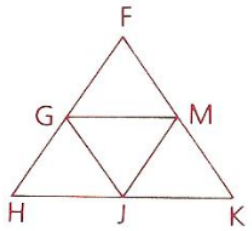
$BC = EC$

$\angle 3 = \angle 4$

Vert

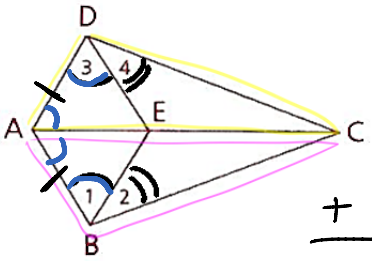
18 Given: $\overline{FH} \cong \overline{FK}$,
$\angle H \cong \angle K$;
G is the midpt. of $\overline{FH}$.
M is the midpt. of $\overline{FK}$.
J is the midpt. of $\overline{HK}$.

Conclusion: $\triangle GHJ \cong \triangle MKJ$



25 Given: $\angle 3 \cong \angle 1$, $\angle 4 \cong \angle 2$,
$\angle DAC \cong \angle 3$, $\angle BAC \cong \angle 1$,
$\overline{AD} \cong \overline{AB}$

Prove: $\triangle CAD \cong \triangle CAB$



~~SSS~~
SAS
ASA
S
$\overline{AD} = \overline{AB}$

A
$\angle 1 = \angle 3$
$+ \angle 2 = \angle 4$
$\angle ABC = \angle ADC$

A
$\angle DAC = \angle 3$
$\angle BAC = \angle 1$
$\angle DAC = \angle BAC$
Trans

1. $\angle 1 \cong \angle 3$ 1. Given
2. $\angle 2 \cong \angle 4$ 2. Given
A 3. $\angle ABC \cong \angle ADC$ 3. Add (1&2)
S 4. $\overline{AD} \cong \overline{AB}$ 4. Given
5. $\angle DAC \cong \angle 3$ 5. Given
$\angle BAC \cong \angle 1$
A 6. $\angle DAC \cong \angle BAC$ 6. Trans (4&5)
7. $\triangle CAD \cong \triangle CAB$ 7. ASA (3,4,6)