

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 MATHEMATICAL KNOWLEDGE
4. DISCOVER NEW MATH
5. CREATE AXIOMATIC SYSTEM

LEVELS OF REASONING: ① EXTERNAL Reasoning *external motivation* ② Empirical *observation* ③ Analytical *internal motivation*

What are the three postulates that prove triangles congruent?

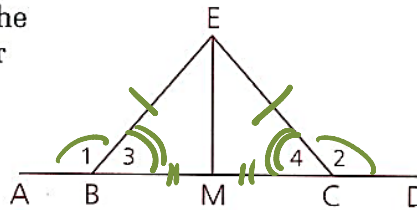
SAS, SSS, & ASA

Sample Problems

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

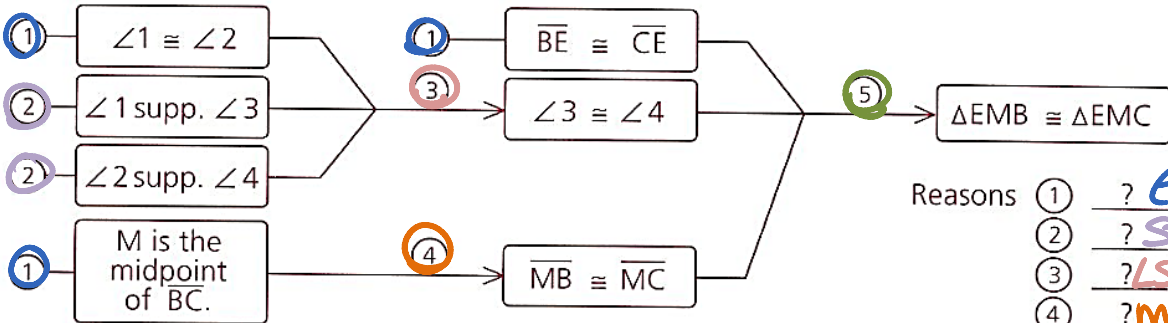
Given: $\angle 1 \cong \angle 2$;
M is the midpt. of \overline{BC} .
 $\overline{BE} \cong \overline{CE}$

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



SSS
SAS
~~ASA~~

Map



Reasons ① ? *Given*
② ? *st $\angle \Rightarrow$ suppl \angle s*
③ ? *\angle s suppl $\cong \angle$ s $\Rightarrow \cong \angle$ s*
④ ? *mdpt $\Rightarrow \cong$ segs*
⑤ ? *SAS*

$\overline{BE} \cong \overline{CE}$

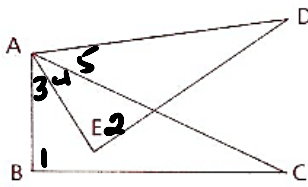
21 In problem 20, what given information is not needed to prove the triangles congruent?

$\angle 1 \cong \angle 2 \because \overline{EM} \cong \overline{EM} (ref) \rightarrow SSS$

Problem Set C

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

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



$\overline{AB} \cong \overline{AE}$

$\overline{AB} \perp \overline{BC}$
 $\overline{AE} \perp \overline{DE}$

$\overline{AE} + \overline{AC}$ trisect \angle

$\angle 1 \& \angle 2 \cong \angle 1 \& \angle 2$

$\angle 1 \cong \angle 2$

1. $\overline{AE} + \overline{AC}$ trisect $\angle BAD$

1. Given

2. $\angle BAC \cong \angle EAD$

2. Division

3. $\overline{AB} \cong \overline{AE}$

3. Given

4. $\overline{AB} \perp \overline{BC}$, $\overline{AE} \perp \overline{DE}$

4. Given

5. $\angle ABC \& \angle AED$ rt \angle

5. $\perp \Rightarrow$ rt \angle

6. $\angle ABC \cong \angle AED$

6. rt \angle s $\Rightarrow \cong$ \angle s

7. $\triangle ABC \cong \triangle AED$

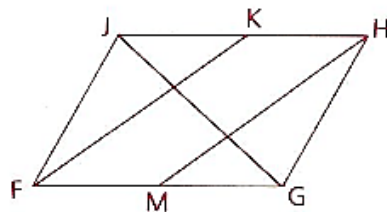
7. ASA (2 3 6)

Name
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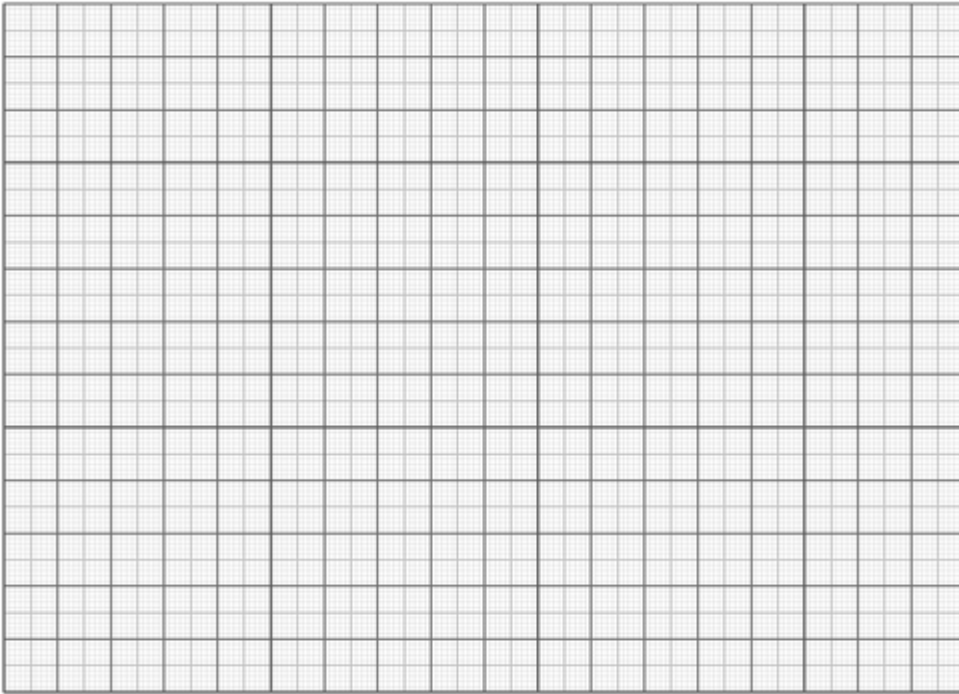
AMDG
3: Congruent Triangles
3.2

Ms. Kresovic
Date:

- 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 $\triangle ABC \cong \triangle FDE$.

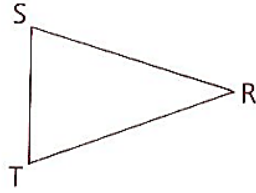


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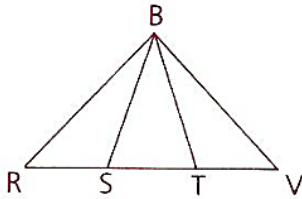
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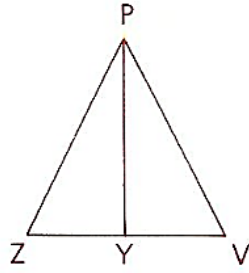
22 Given: $\overline{RS} \cong \overline{RT}$
Conclusion: $\triangle RST \cong \triangle RTS$



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 $\angle VPZ$.
 $\angle VPY = (2x + 7)^\circ$,
 $\angle ZPY = (3x - 9)^\circ$,
 $PZ = \frac{1}{2}x + 5$,
 $PV = x - 3$
- Prove: $\triangle VPY \cong \triangle ZPY$
(Use a paragraph proof.)



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3.2

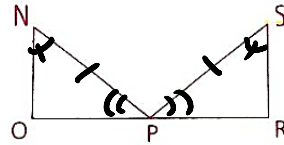
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Homework

Q+A 10/6

- 11 Given: $\angle N$ is comp. to $\angle NPO$.
 $\angle S$ is comp. to $\angle SPR$.
 $\angle NPO \cong \angle SPR$,
 $\overline{NP} \cong \overline{SP}$

Conclusion: $\triangle NOP \cong \triangle SRP$

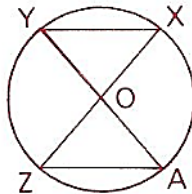


SSS
SAS
ASA

1. $\angle N$ comp $\angle NPO$
 $\angle S$ comp $\angle SPR$
A $\angle NPO \cong \angle SPR$
S 2. $\overline{NP} \cong \overline{SP}$
A 3. $\angle N \cong \angle S$
4. $\triangle NOP \cong \triangle SRP$

1. GIVEN
2. Given
3 $\angle S$ comp to $\cong \angle N \Rightarrow \cong \angle N$ (1)
4. ASA (1, 2, 3)

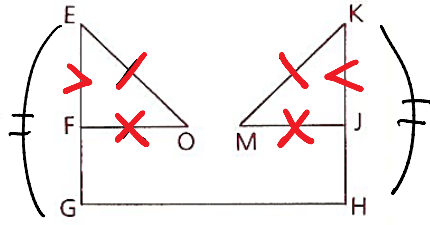
- 12 Given: O is the midpt. of \overline{AY} .
O is the midpt. of \overline{ZX} .
Conclusion: $\triangle ZOA \cong \triangle XOY$



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- 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: $\triangle EFO \cong \triangle KJM$



SSS
 SAS
 ASA

1. $\overline{EG} \cong \overline{KH}$
 F midpt \overline{EG}
 J midpt \overline{KH}

1 Given

S 2. $\overline{EF} \cong \overline{KJ}$

2. Divide (1)

S 3. $\overline{EO} \cong \overline{KM}$

3. Given

S 4. $\overline{FO} \cong \overline{JM}$

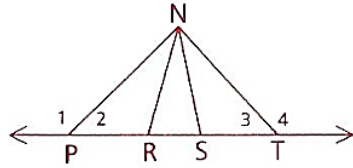
4. Given

S 5. $\triangle EFO \cong \triangle KJM$

5. SSS (2, 3, 4)

- 14 Given: $\angle 1 \cong \angle 4$,
 $\overline{PR} \cong \overline{TS}$,
 $\overline{NP} \cong \overline{NT}$

Prove: $\triangle NPR \cong \triangle NTS$



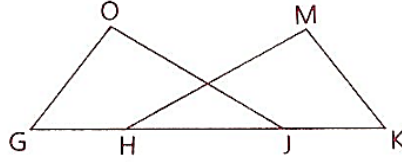
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3.2

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- 15 Given: $\overline{GH} \cong \overline{KJ}$,
 $\overline{HM} \cong \overline{JO}$,
 $\overline{GO} \cong \overline{KM}$

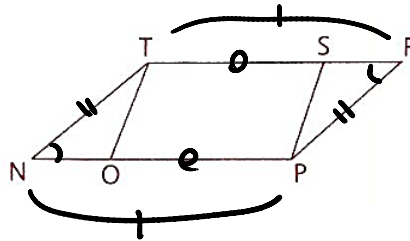
Prove: $\triangle GOJ \cong \triangle KMH$



- 16 Given: $\angle R \cong \angle N$,
 $\overline{RP} \cong \overline{NT}$,
 $\overline{RT} \cong \overline{NP}$,
 $\overline{TS} \cong \overline{OP}$

SAS
ASA

Conclusion: $\triangle NOT \cong \triangle RSP$



4 $\angle R = \angle N$

5 $RP = NT$
1 $RT = NP$
2 $TS = OP$
3 $SR = NO$

1. GIVEN

2. SUBTRACT (1.1)

3. GIVEN

4. GIVEN

5. SAS (2,3,4)

1. $\overline{RT} \cong \overline{NP}$

$\overline{TS} \cong \overline{OP}$

5 2. $\overline{SR} \cong \overline{NO}$

A 3. $\angle R \cong \angle N$

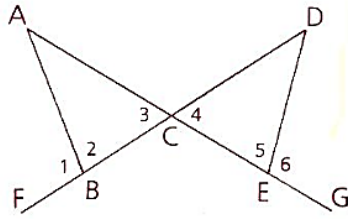
S 4. $\overline{RP} \cong \overline{NT}$

5. $\triangle NOT \cong \triangle RSP$

AMDG

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

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

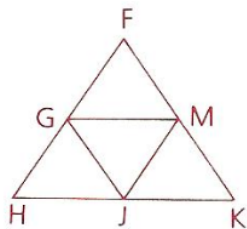


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3: Congruent Triangles
3.2

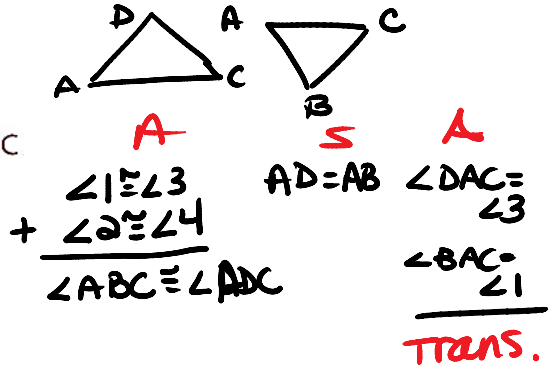
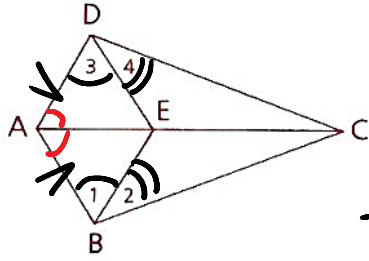
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- 18** Given: $\overline{FH} \cong \overline{FK}$,
 $\angle H \cong \angle K$;
G is the midpt. of \overline{FH} .
M is the midpt. of \overline{FK} .
J is the midpt. of \overline{HK} .
Conclusion: $\triangle GHJ \cong \triangle MKJ$



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: $\triangle CAD \cong \triangle CAB$



- 1. $\angle 1 \cong \angle 3$
- 2. $\angle 2 \cong \angle 4$
- A 3. $\angle ABC \cong \angle ADC$
- S 4. $\overline{AD} \cong \overline{AB}$
- 5. $\angle DAC \cong \angle 3$
 $\angle BAC \cong \angle 1$
- A 6. $\angle DAE \cong \angle BAE$
- 7. $\triangle CAD \cong$
 $\triangle CAB$

- 1. Given
- 2. Given
- 3. Add (1+2)
- 4. Given
- 5. Given
- 6. Trans (1+5)
- 7. ASA (3+4+6)