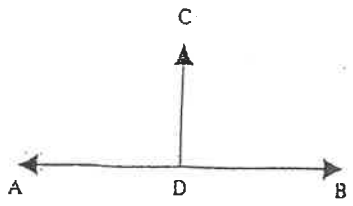
Algebraic Applications of Proving Lines Perpendicular

1. Let D be a point on $\overline{AB}$ between A and B.

   If $\overline{CD} \perp \overline{AB}$, $m\angle ADC = 3x - y$, and $m\angle CDB = 2x + y$, find the value of x and y.



2. $\overline{AB}$ intersects $\overline{CD}$ at E, $m\angle AEC = 3x$ and $m\angle AED = 5x - 60$.

   Show that $\overline{AB}$ is perpendicular to $\overline{CD}$.

3. In ΔRST, a line drawn from vertex R intersects $\overline{ST}$ at B. If $m\angle SBR = \frac{3}{2}x + 30$ and $m\angle TBR = 4x - 70$, **show that $\overline{RB}$ is an altitude in ΔRST.**

Proving Lines Perpendicular

Theorem: If two intersecting lines form **congruent adjacent angles**, then they are perpendicular.

To prove 2 lines or segments are perpendicular:

- Show when the two lines or segments intersect, they form right angles.

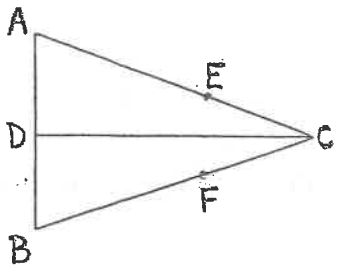
OR

- Show when the two lines or segments intersect, they form **congruent adjacent angles**.

****

1. Given: $\overline{CE} \cong \overline{CF}$
   $\overline{EA} \cong \overline{FB}$
   D is the midpoint of $\overline{AB}$

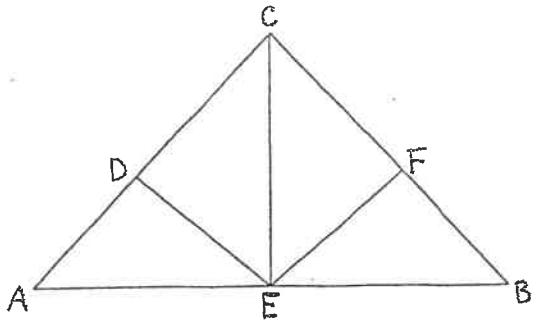
   Prove: $\overline{AB} \perp \overline{CD}$



Statements	Reasons

2. Given: $\angle AEF \cong \angle BED$
$\angle CEF \cong \angle CED$

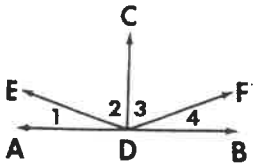
Prove: $\overline{AB} \perp \overline{CE}$



Statements	Reasons

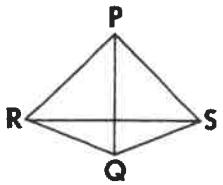
Proving Lines ⊥ & Algebraic Applications

EXERCISES

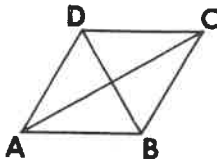


Ex. 1

Ex. 2



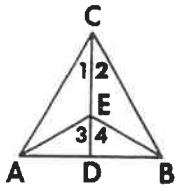
Ex. 3



Ex. 4

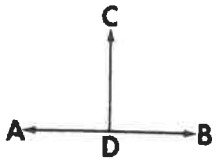
1. Given $\overleftrightarrow{ADB}$, $\angle 1 \cong \angle 4$, and $\angle 2 \cong \angle 3$, prove that $\overleftrightarrow{CD} \perp \overleftrightarrow{AB}$.
2. If $\overline{AC} \cong \overline{BC}$ and $\overline{CD}$ bisects $\angle ACB$, prove that $\overline{CD} \perp \overline{AB}$.
3. If $\overline{PR} \cong \overline{PS}$ and $\overline{QR} \cong \overline{QS}$, prove that $\overline{PQ} \perp \overline{RS}$.
4. If polygon $ABCD$ is equilateral ($AB = BC = CD = DA$), prove that $\overline{DB} \perp \overline{AC}$.

5. Given $\overline{CED}$, $\angle 1 \cong \angle 2$, and $\angle 3 \cong \angle 4$; prove that $\overline{CD}$ is the perpendicular bisector of $\overline{AB}$.



6. *Prove:* The bisector of the vertex angle of an isosceles triangle is perpendicular to the base of the triangle.

In 7–9, let D be a point on $\overleftrightarrow{AB}$ between A and B.



Ex. 7–9

7. Given $m\angle ADC = 3x + 18$ and $m\angle CDB = 4x - 6$.
   a. Find the value of x.
   b. Show that $\overleftrightarrow{CD} \perp \overleftrightarrow{AB}$.
8. If $\overleftrightarrow{CD} \perp \overleftrightarrow{AB}$, $m\angle ADC = 3x - y$, and $m\angle CDB = 2x + y$, find the value of x and the value of y.
9. If $\overleftrightarrow{CD} \perp \overleftrightarrow{AB}$, $m\angle CDA = 7x + y$, and $m\angle CDB = x + 4y$, find the value of x and the value of y.

10. $\overleftrightarrow{AB}$ intersects $\overleftrightarrow{CD}$ at E, $m\angle AEC = 3x$ and $m\angle AED = 5x - 60$.
    a. Find x. **b.** Show that $\overleftrightarrow{AB}$ is perpendicular to $\overleftrightarrow{CD}$.
11. In triangle ABC, a line drawn from vertex A intersects $\overline{BC}$ in D. If $m\angle ADB = 6x$ and $m\angle ADC = 9x - 45$, show that $\overline{AD} \perp \overline{BC}$.
12. In $\triangle RST$, a line drawn from vertex R intersects $\overline{ST}$ in B. If $m\angle SBR = \frac{3}{2}x + 30$ and $m\angle TBR = 4x - 70$, show that $\overline{RB}$ is an altitude in $\triangle RST$.

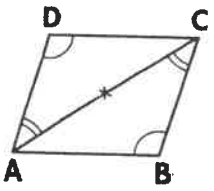
Name _____

AAS Homework

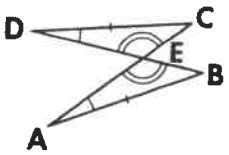
Complete # 1-10 on a separate sheet of paper.

EXERCISES

In 1–6, the figures have been marked to indicate the *given* premises. Tell whether or not the triangles must always be congruent, and give your reason.



Ex. 1



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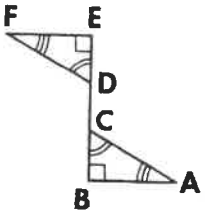

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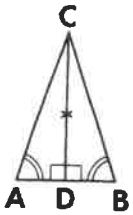

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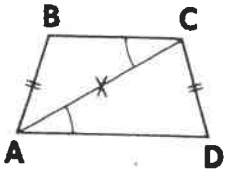
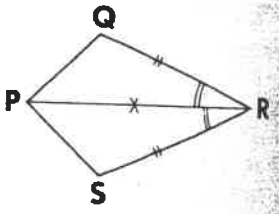
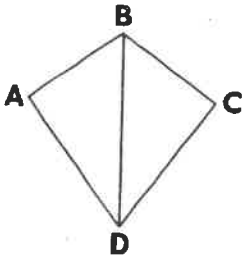


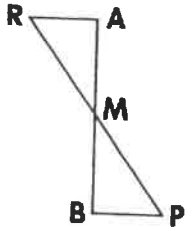
Ex. 5



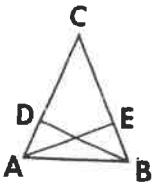
Ex. 6



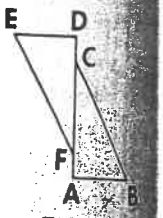
Ex. 7



Ex. 8



Ex. 9



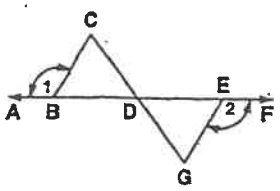
Ex. 10

7. *Given:* $\overline{BD}$ bisects $\angle B$ and $\angle A \cong \angle C$.
   Prove: $\triangle ADB \cong \triangle CDB$.
8. *Given:* $\overline{RMP}$ bisects $\overline{AMB}$ at M, and $\angle R \cong \angle P$.
   Prove: $\overline{RM} \cong \overline{PM}$.
9. *Given:* In $\triangle ACB$, $\overline{AC} \cong \overline{BC}$ and $\angle ADB \cong \angle BEA$.
   Prove: $\overline{AE} \cong \overline{BD}$.
10. *Given:* $\overline{AFCD}$, $\overline{ED} \perp \overline{DA}$, $\overline{BA} \perp \overline{DA}$, $\overline{DC} \cong \overline{AF}$, and $\angle E \cong \angle B$.
    Prove: $\overline{EF} \cong \overline{BC}$.

Proving Triangles Congruent Using the AAS Postulate

Given: $\overleftrightarrow{AF}$ and $\overline{CG}$ intersect at D,
$\overline{CB} \cong \overline{GE}$,
$\angle 1 \cong \angle 2$.

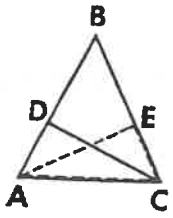
Prove: $\triangle CBD \cong \triangle GED$



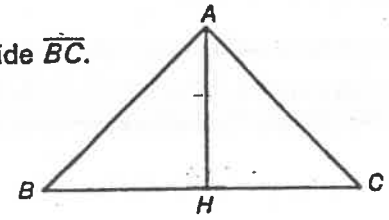
2. *Given:* Isosceles $\triangle ABC$ with $\overline{BA} \cong \overline{BC}$.
$\overline{CD} \perp \overline{BA}$ and $\overline{AE} \perp \overline{BC}$.

Prove: $\overline{CD} \cong \overline{AE}$.

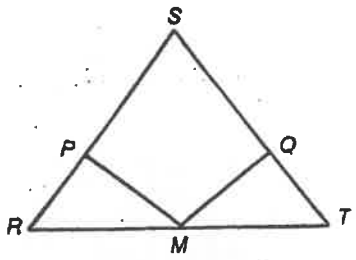
Plan: Prove $\triangle DAC \cong \triangle ECA$



3. Given: $\angle B \cong \angle C$,
$\overline{AH}$ is the altitude to side $\overline{BC}$.
Prove: $\overline{AB} \cong \overline{AC}$.

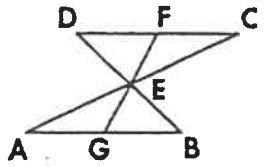


4. Given: $\overline{SR} \cong \overline{ST}$,
$\overline{MP} \perp \overline{RS}$, $\overline{MQ} \perp \overline{ST}$,
M is the midpoint of $\overline{RT}$.
Prove: $\overline{MP} \cong \overline{MQ}$.

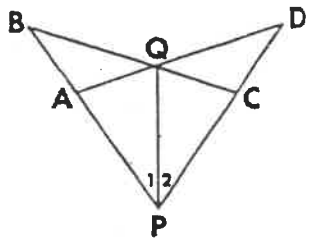


Using Two Pairs of Congruent Triangles

1. *Given:* $\overline{AEC}$, $\overline{BED}$, and $\overline{GEF}$; $\overline{AE} \cong \overline{CE}$, $\overline{FE} \cong \overline{GE}$.
Prove: a. $\triangle FEC \cong \triangle GEA$. b. $\angle C \cong \angle A$. c. $\triangle DEC \cong \triangle BEA$.



2. *Given:* $\overline{PQ}$, $\overline{PAB}$, $\overline{PCD}$, $\overline{AQD}$, and $\overline{CQB}$. $\angle 1 \cong \angle 2$ and $\overline{AP} \cong \overline{CP}$.
Prove: $\overline{QB} \cong \overline{QD}$.



Parallel Lines in Proofs

To prove two lines that are cut by a transversal are parallel, prove that any ONE of the following is true:

1. A pair of alternate interior angles are congruent.
2. A pair of corresponding angles are congruent.
3. A pair of interior angles on the same side of the transversal are supplementary.

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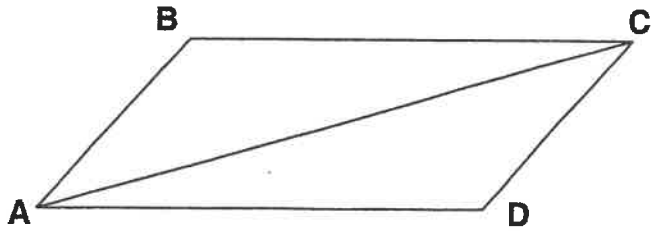
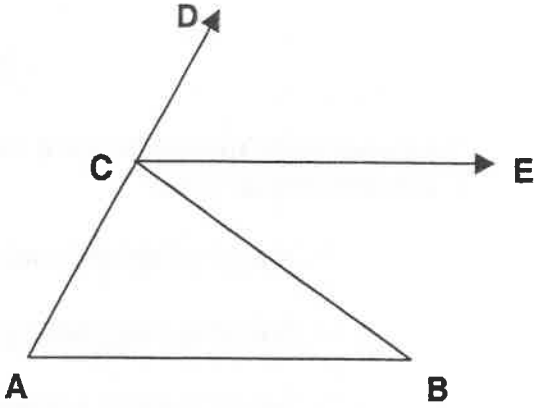
1. Given: Quadrilateral ABCD, $\overline{BC} \cong \overline{DA}$

   $\overline{BC} \parallel \overline{DA}$

   Prove: $\overline{AB} \parallel \overline{CD}$

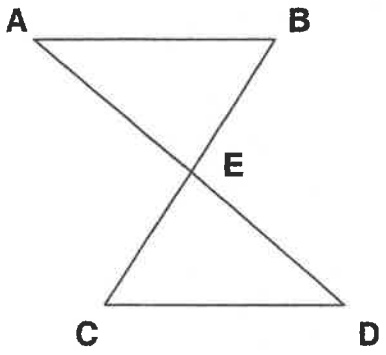


2.



If $\overrightarrow{CE}$ bisects $\angle DCB$ and $\overrightarrow{CE} \parallel \overline{AB}$, prove $\angle A \cong \angle B$.

3.



Given: $\overline{AD}$ and $\overline{BC}$ bisect each other at E
Prove: $\overline{AB} \parallel \overline{CD}$,

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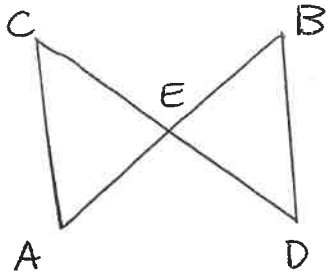
PARALLEL LINE PROOFS

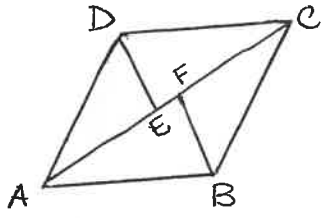
1) 

Given: $\overline{AB}$ & $\overline{CD}$ bisect each other at E.

Prove: a) $\triangle CEA \cong \triangle DEB$

b) $\angle ECA \cong \angle EDB$

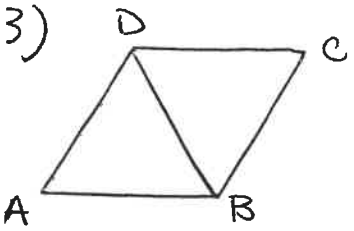
c) $\overline{CA} \parallel \overline{DB}$

2) 

Given: $\overline{DE} \perp \overline{AC}$, $\overline{BF} \perp \overline{AC}$, $\overline{AF} \cong \overline{CE}$ and $\overline{DE} \cong \overline{BF}$

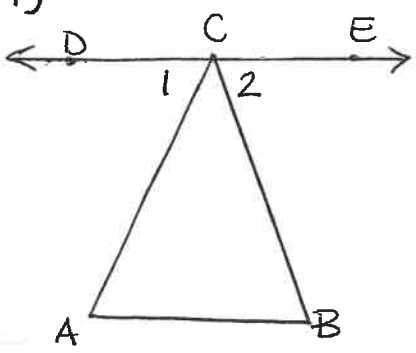
Prove: a) $\triangle ADE \cong \triangle CBF$

b) $\overline{DA} \parallel \overline{BC}$

3) 

Given: $\overline{AB} \parallel \overline{DC}$, $\overline{AB} \cong \overline{CD}$

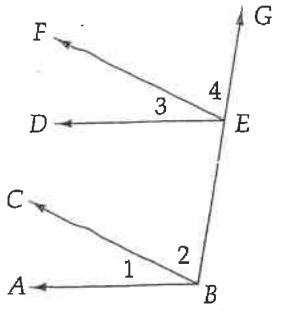
Prove: $\overline{AD} \cong \overline{CB}$ and $\overline{AD} \parallel \overline{BC}$

4) 

Given: $\overleftrightarrow{DCE} \parallel \overline{AB}$, $\angle 1 \cong \angle 2$

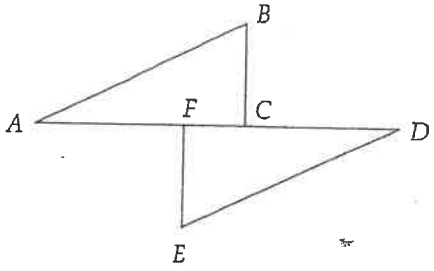
Prove: $\angle A \cong \angle B$

5)



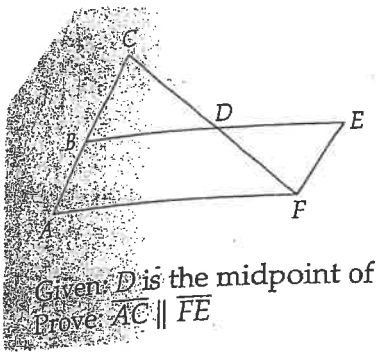
Given: $\angle 1 \cong \angle 3$ and $\angle 2 \cong \angle 4$
Prove: $\overrightarrow{ED} \parallel \overrightarrow{BA}$

6)



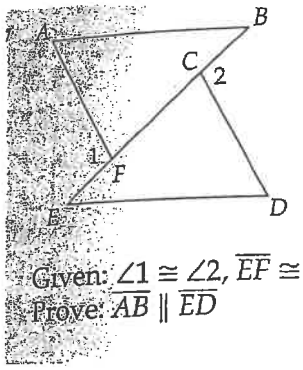
Given: $\overline{BC} \perp \overline{AD}, \overline{EF} \perp \overline{AD}, \overline{BC} \cong \overline{EF}, \overline{CD} \cong \overline{AF}$
Prove: $\overline{ED} \parallel \overline{AB}$

7)



Given: D is the midpoint of $\overline{CF}$ and of $\overline{BE}$
Prove: $\overline{AC} \parallel \overline{FE}$

8)



Given: $\angle 1 \cong \angle 2, \overline{EF} \cong \overline{CB}, \overline{AF} \cong \overline{CD}$
Prove: $\overline{AB} \parallel \overline{ED}$

Name _____ Date _____

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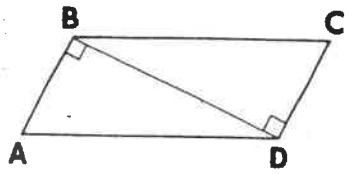
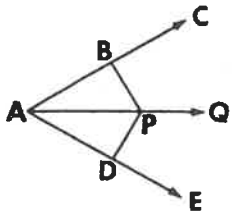
HYPOTENUSE-LEG PROOFS

EXERCISES

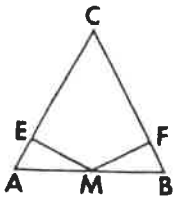


Ex. 1

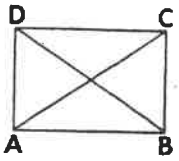


Ex. 2

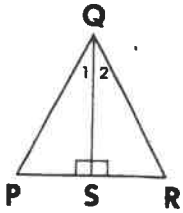
1. *Given:* Right $\angle ABD$, right $\angle CDB$, and $\overline{AD} \cong \overline{CB}$.
   Prove: $\triangle ABD \cong \triangle CDB$.
2. *Given:* $\overline{PB} \perp \overrightarrow{AC}$, $\overline{PD} \perp \overrightarrow{AE}$, and $\overline{AB} \cong \overline{AD}$.
   Prove: $\triangle ABP \cong \triangle ADP$.



Ex. 3



Ex. 4

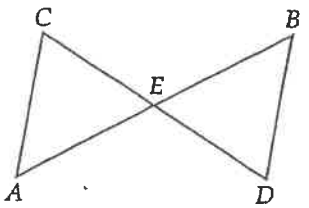


Ex. 5

3. If M is the midpoint of $\overline{AB}$, $\overline{ME} \perp \overline{AC}$, $\overline{MF} \perp \overline{CB}$, and $\overline{ME} \cong \overline{MF}$, prove that $\angle CAB \cong \angle CBA$.
4. If $\overline{DA} \perp \overline{AB}$, $\overline{CB} \perp \overline{AB}$, and $\overline{AC} \cong \overline{BD}$, prove that:
   a. $\triangle ACB \cong \triangle BDA$. **b.** $\overline{AD} \cong \overline{BC}$.
5. In $\triangle PQR$, $\overline{QS} \perp \overline{PR}$, $\overline{PQ} \cong \overline{RQ}$, $m\angle 1 = 4x$, and $m\angle 2 = 2x + 18$.
   a. Prove $\triangle PQS \cong \triangle RQS$. **b.** Find the value of x. **c.** Find $m\angle 1$.

Name: _____

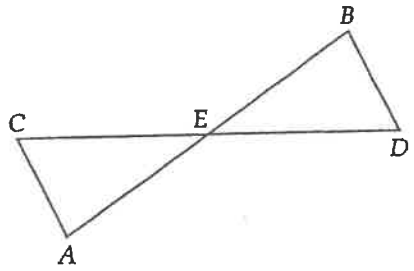
12 In the diagram below, $\overline{AE} \cong \overline{BE}$ and $\overline{CE} \cong \overline{DE}$.



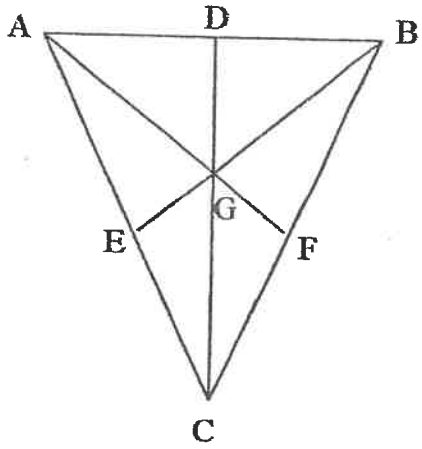
a Explain why $\triangle AEC \cong \triangle BED$.

b Given the following, find the lengths of the three sides of each triangle:
$AC = 2x$
$BD = x + 5$
$AE = x + 6$
$EC = x + 7$

13 In the diagram below, $\overline{AE} \cong \overline{BE}$, $\overline{CE} \cong \overline{DE}$, and $\angle ACE \cong \angle AEC$, $m\angle ACE = 5x$, and $m\angle BDE = 7x - 18$. Show that $\triangle DBE$ is a right triangle.



15 Alyssa says that two triangles are congruent if two pairs of sides are congruent and one pair of angles are congruent. Is she right? Explain.



Using the above diagram, answer questions 16-22.

16. Name a linear pair.

17. Name a pair of vertical angles.

18. If $\overline{CD} \perp \overline{AB}$, name a pair of right ang

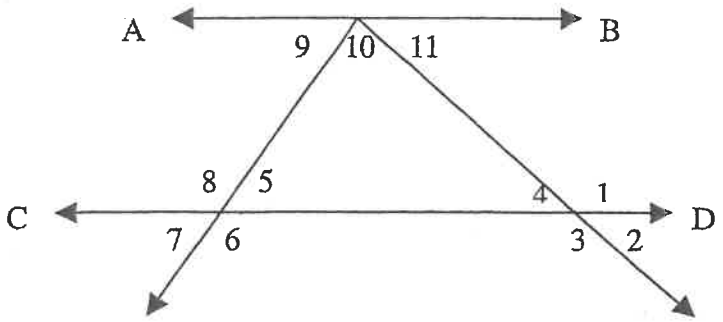
19. If $\angle EGF$ is a right angle, name a pair of complementary angles.

20. If $\overline{CD}$ bisects $\angle ACB$, what conclusion can you make?

21. Name a pair of adjacent angles.

22. If $\overline{CD}$ bisects $\overline{AB}$, what conclusion can you make?

Proof Toolbox: Parallel Lines



Important Angle Relationships:

Alternate Interior Angles: Look for a Z or N
$\angle 11 \& \angle 4$, $\angle 9 \& \angle 5$

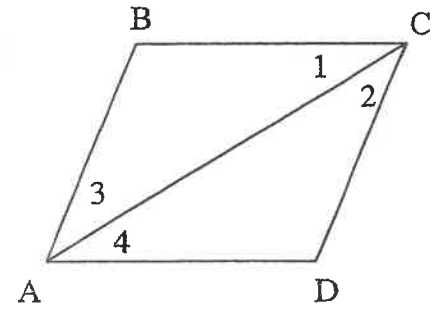
Corresponding Angles: Look for an F
$\angle 11 \& \angle 2$, $\angle 9 \& \angle 7$

Interior Angles on the Same side of the Transversal: Look for a U
$\angle 11 \& \angle 1$, $\angle 9 \& \angle 8$

Proving Lines Parallel:

1. If you are given Parallel Lines:
Part A:

Given: $\overline{BC} \parallel \overline{AD}$

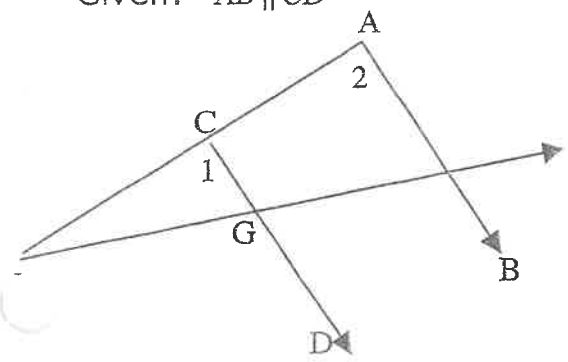


Statements	Reasons
1. $\overline{BC} \parallel \overline{AD}$	1. Given
2. $\angle 1 \cong \angle 4$	2. If 2 $\parallel$ lines are cut by transversal, then their alt. int. $\angle$'s are $\cong$

***Note: You cannot say $\angle 2 \cong \angle 3$, unless you know that $\overline{AB} \parallel \overline{CD}$*

Part B:

Given: $\overline{AB} \parallel \overline{CD}$

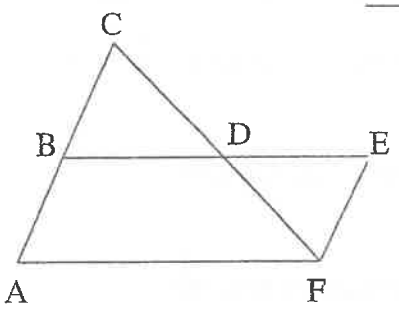


Statements	Reasons
1. $\overline{AB} \parallel \overline{CD}$	1. Given
2. $\angle 1 \cong \angle 2$	2. If 2 $\parallel$ lines are cut by transversal, then their corr. $\angle$'s are $\cong$

2. If you must Prove Parallel Lines:

Part A:

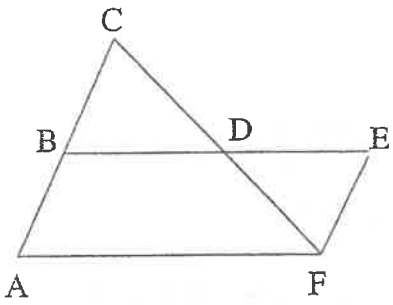
Prove: $\overline{AC} \parallel \overline{FE}$



Statements	Reasons
1. $\angle ACD \cong \angle EFD$	1. Corresponding Parts of $\cong \triangle$'s are $\cong$. (Possibly)
2. $\overline{AC} \parallel \overline{FE}$	2. If 2 lines cut by a trans. form $\cong$ alt. int. $\angle$'s then lines are $\parallel$.

Part B:

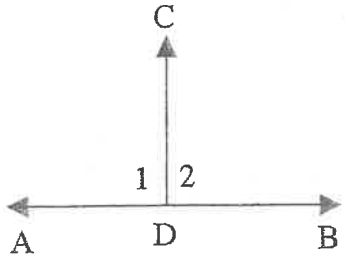
Prove: $\overline{BE} \parallel \overline{AF}$



Statements	Reasons
1. $\angle CBD \cong \angle BAF$	1. Given
2. $\overline{BE} \parallel \overline{AF}$	2. If 2 lines cut by a trans. form $\cong$ corr. $\angle$'s then lines are $\parallel$.

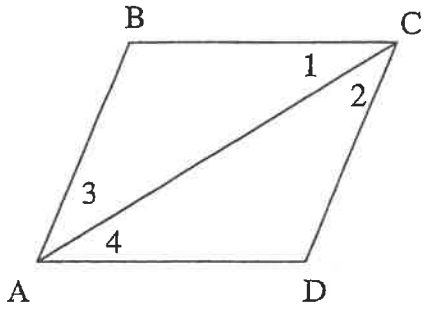
3. Proving Lines Perpendicular:

Prove: $\overline{AB} \perp \overline{CD}$

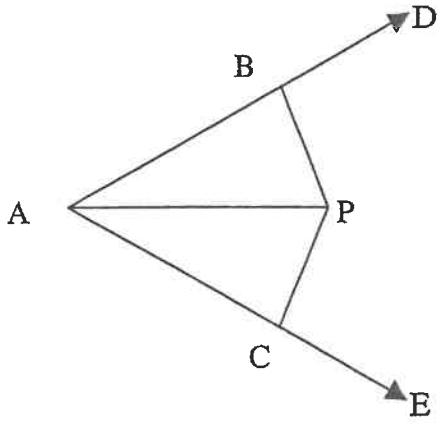


Statements	Reasons
1. $\angle 1 \cong \angle 2$	1. Given
2. $\overline{AB} \perp \overline{CD}$	2. If 2 lines intersect to form $\cong$ adjacent $\angle$'s, then lines are $\perp$.

4. Proving Δ's are ≅ by AAS≅AAS. Just make sure you have the right order!!!



5. Proving Δ's are ≅ by Hypotenuse-Leg: HL≅HL.



You must have 3 things after you have your right angles for hypotenuse-leg:

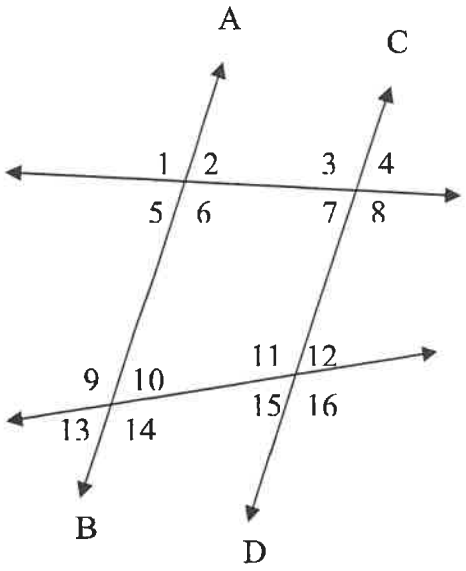
1. Find your hypotenuses and prove they're congruent. (The hypotenuse is the longest side and it's across from the right angle)
2. Find a pair of legs and prove they're congruent.
3. State that the two triangles are right triangles.

Name _____

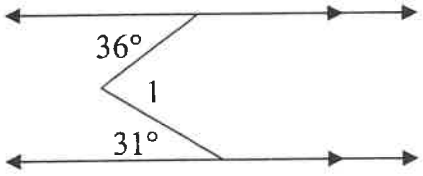
Properties of Parallel Lines

1. In the figure $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, $m\angle 3 = 110$ and $m\angle 12 = 55$.
   Find:

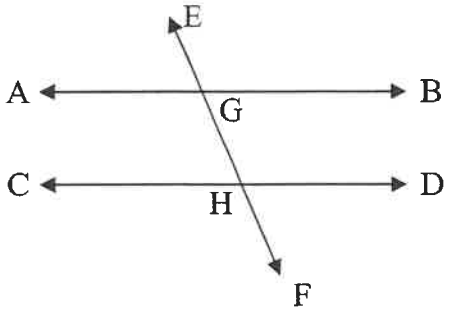
$m\angle 1$	$m\angle 10$
$m\angle 2$	$m\angle 13$
$m\angle 6$	$m\angle 15$



2. Find the measure of angle 1.



3. If $m\angle EGA = 2x$ and $m\angle GHC = 5x - 54$, find the value of x.



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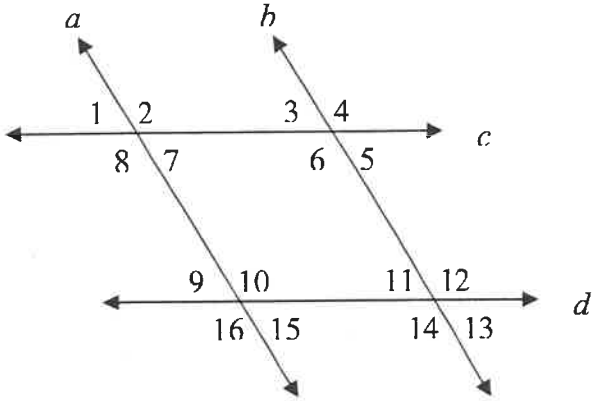
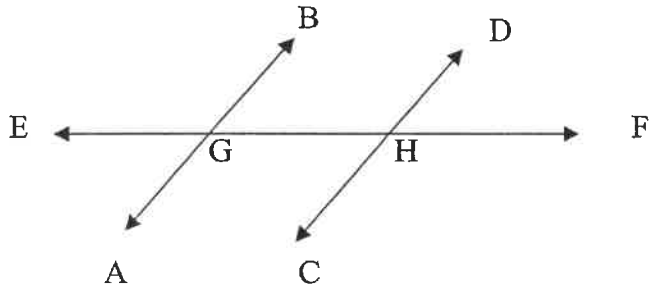


If $a \parallel b$ and $c \parallel d$, $m\angle 3 = 34$ find:

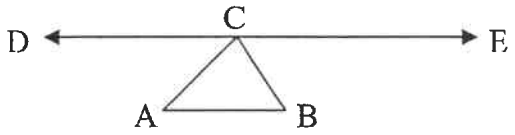
$m\angle 2$	$m\angle 11$
$m\angle 7$	$m\angle 13$
$m\angle 10$	$m\angle 16$

5. Two parallel lines are cut by a transversal. One of the two interior angles on the same side of the transversal contains 15° more than the other. Find the degree measure of the smaller angle.

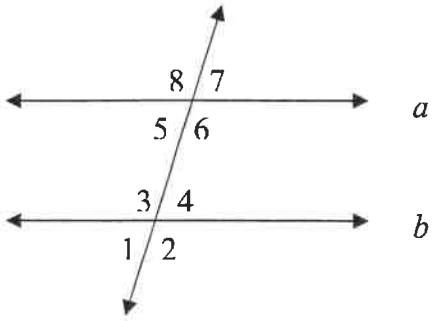
6. In the accompanying diagram, $\overline{AB} \parallel \overline{CD}$. If $m\angle AGH = 40 - x$ and $m\angle GHC = 6x + 10$, find the value of x.



7. If $\overline{DE} \parallel \overline{AB}$, $m\angle DCA = 40$, $m\angle ECB = 70$, find the measures of each angle of ΔABC.



8. In the accompanying figure, $a \parallel b$, $m\angle 3 = 2y$, $m\angle 4 = x + y$, and $m\angle 5 = 2x - y$, find $m\angle 3, m\angle 4, m\angle 5$.
(Hint: Set up a system of equations for this. That means 2 equations with x's and y's)



Parallel Lines in Proofs

To prove two lines that are cut by a transversal are parallel, prove that any ONE of the following is true:

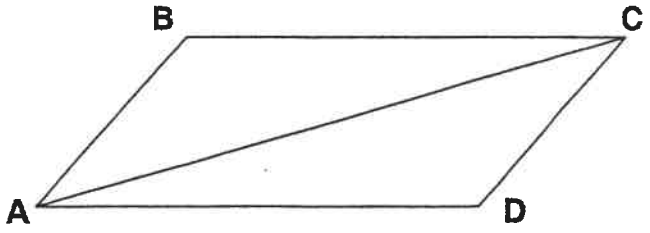
1. A pair of alternate interior angles are congruent.
2. A pair of corresponding angles are congruent.
3. A pair of interior angles on the same side of the transversal are supplementary.

---

1. Given: Quadrilateral ABCD, $\overline{BC} \cong \overline{DA}$

   $\overline{BC} \parallel \overline{DA}$

   Prove: $\overline{AB} \parallel \overline{CD}$



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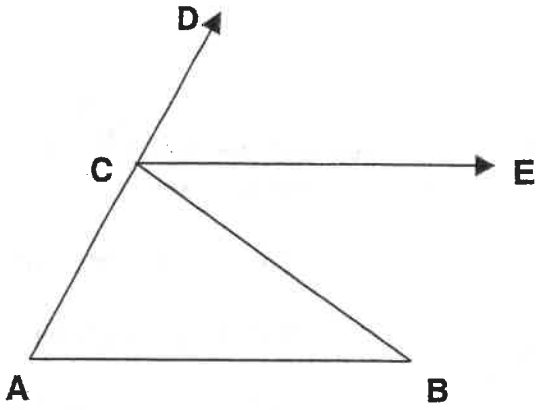
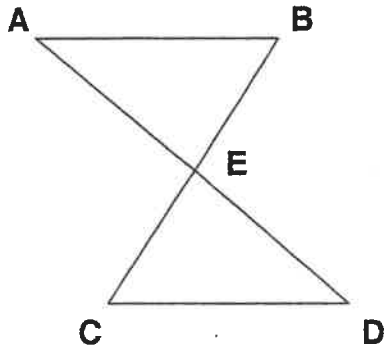


If $\overrightarrow{CE}$ bisects $\angle DCB$ and $\overrightarrow{CE} \parallel \overline{AB}$, prove $\angle A \cong \angle B$.

3.



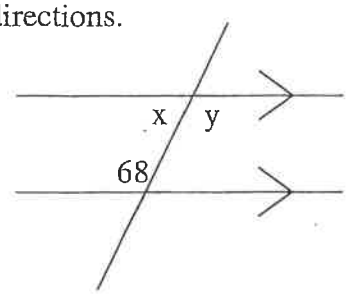
Given: $\overline{AD}$ and $\overline{BC}$ bisect each other at E
Prove: $\overline{AB} \parallel \overline{CD}$,

Name:_____

Geometry R: Parallel Lines & Misc Proof Test Review

Directions: In numbers 1-4, find the angle measures of x and y. Remember the little arrow-heads mean lines are parallel. In numbers 5-8, $l \parallel m$, find the measure of missing angle x. Number 9 has it's own set of directions.

1.



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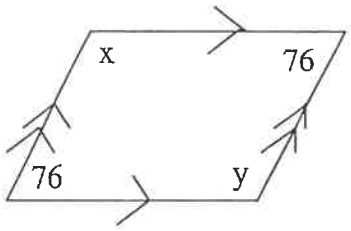

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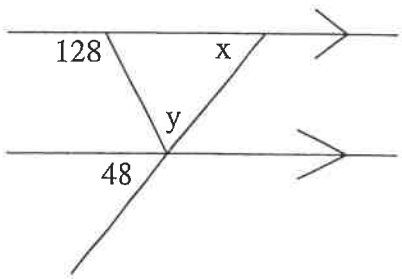

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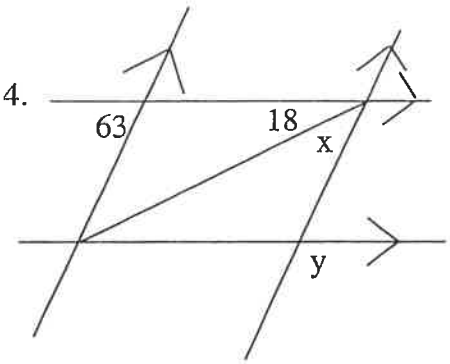

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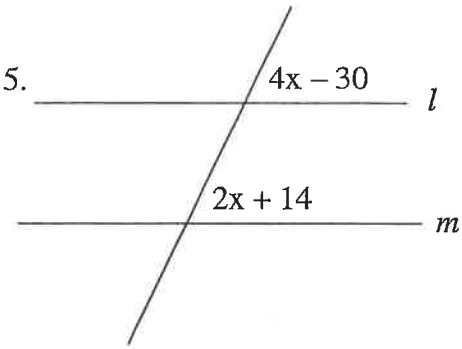

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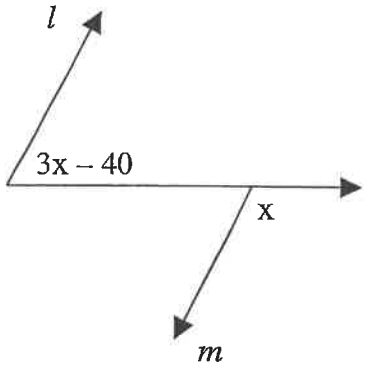

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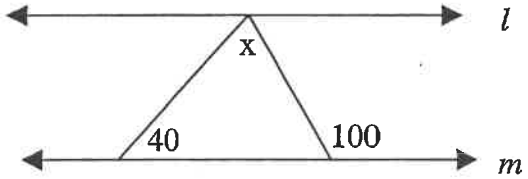

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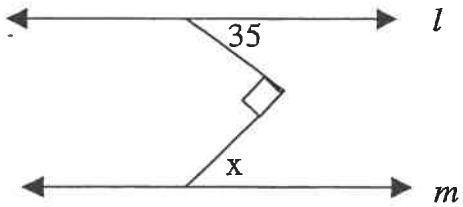
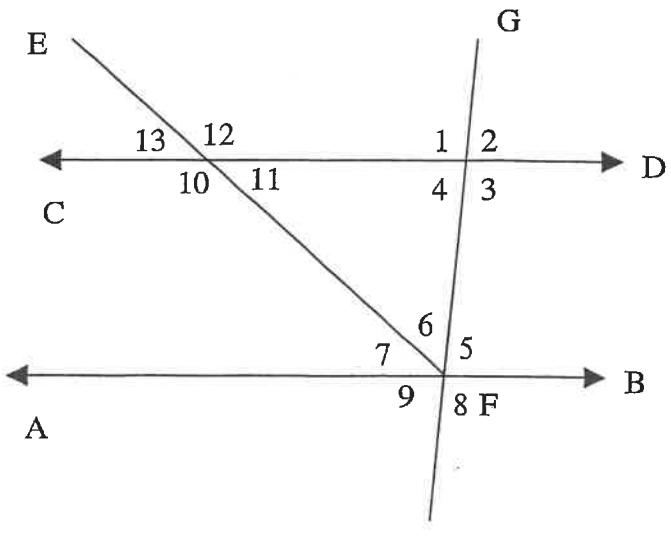


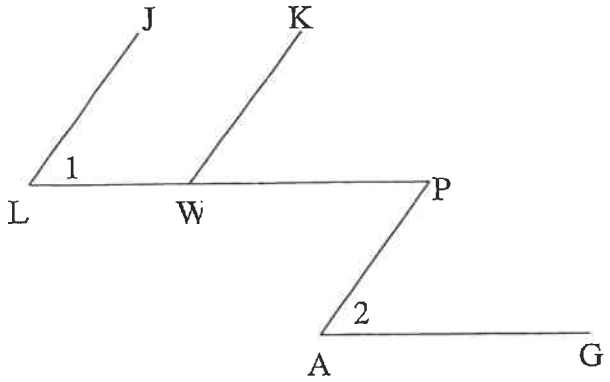
9. In the following diagram, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ and $\overline{EF}$ bisects $\angle AFG$.

   a. If $m\angle 1 = 100$, find the measure of each of the numbered angles.

   b. If $m\angle 3 = 4x - 9$ and $m\angle 5 = x + 19$, find the measure of each of the numbered angles.



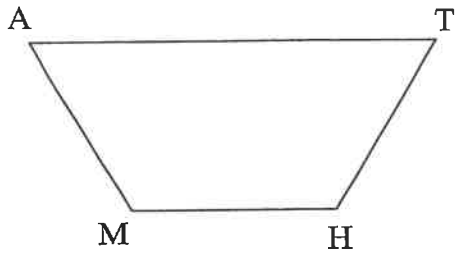
10.



Given: $\overline{LJ} \parallel \overline{WK} \parallel \overline{AP}$, $\overline{PL} \parallel \overline{AG}$

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

11.



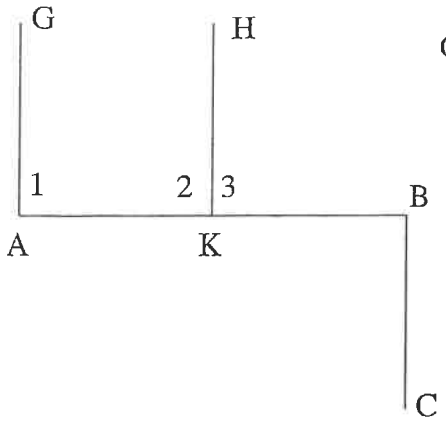
Given: $\overline{AT} \parallel \overline{MH}$

$\angle M \cong \angle H$

Prove: $\angle A \cong \angle T$

Hint: For this proof, you will use the 3rd **reason** we wrote in our notes for parallel line proofs.

12.



Given: $\overline{AG} \parallel \overline{BC}$

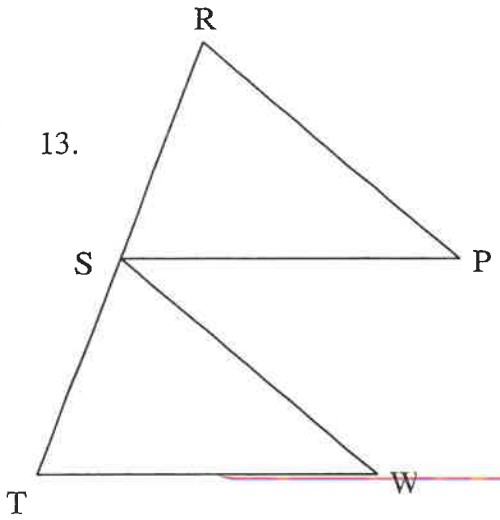
$\overline{KH} \parallel \overline{BC}$

$\angle 1 \cong \angle 2$

Prove: $\overline{HK} \perp \overline{AB}$

Hint: For this proof, look for the capital **F** in the picture and use that type of angles- refer to your notes for parallel lines if you don't remember.

13.



Given: $\overline{TW} \cong \overline{SP}$

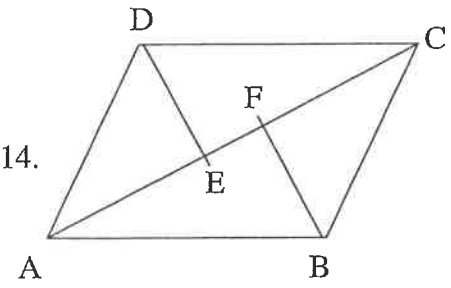
$\overline{RP} \parallel \overline{SW}$

$\overline{SP} \parallel \overline{TW}$

Prove: $\Delta TSW \cong \Delta SRP$

Hint: This proof should be AAS.

14.



Given: $\overline{DE} \perp \overline{AC}, \overline{BF} \perp \overline{AC}$

$\overline{AD} \cong \overline{CB}$

$\overline{AF} \cong \overline{CE}$

Prove: $\Delta ADE \cong \Delta CBF$

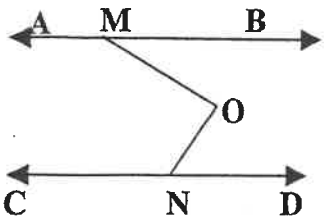
Hint: Use Hy-Leg for this proof.

Name_____

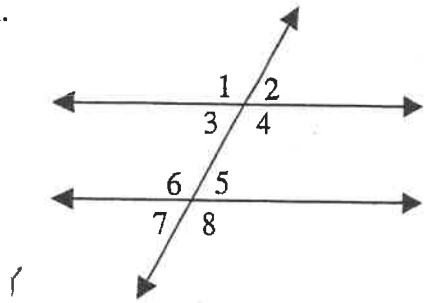
Geometry R: Parallel, Perpendicular Lines, and Misc Proofs

Directions: Show all work and clearly express your answer for full credit.

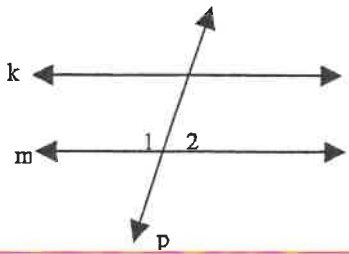
1. In the diagram, $\overline{AB} \parallel \overline{CD}$. If $m\angle BMO = 40$ and $m\angle MON = 112$, find $m\angle DNO$?



2. If m∠4 = 8x + 6 and m∠8 = 10x -20, then find the value of x.

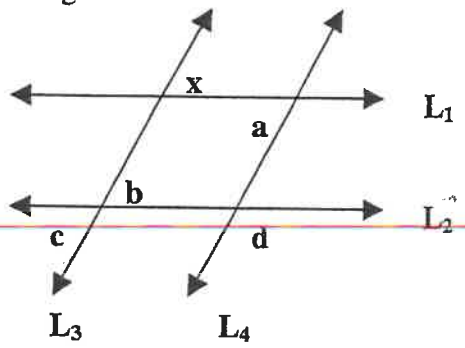


3. If $\angle 1$ and $\angle 2$ are congruent, which must be true?



(A) $m \perp p$ (C) $k \perp m$
(B) $k \parallel m$ (D) $p \parallel m$

4. If, in the accompanying diagram, $L_1 \parallel L_2$ and $L_3 \parallel L_4$, then angle x is NOT always congruent to which angle?



(A) a (C) c
(B) b (D) d

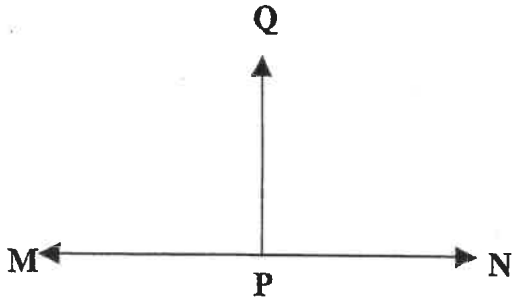
5. Two parallel lines are cut by a transversal. One of two interior angles on the same side of the transversal contains 15° more than the other. Find the degree measure of the larger angle.

6. Given: $\overline{MN}$ and $\overline{PQ}$

$m\angle MPQ = 2x+10$

$m\angle NPQ = 3x-30$

Show that $\overline{MN} \perp \overline{PQ}$

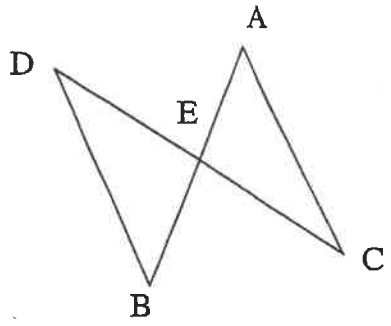


7. If $\overline{AB}$ and $\overline{CD}$ bisect each other at point E,

prove: (a) $\Delta CEA \cong \Delta DEB$

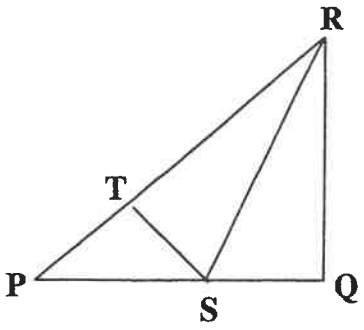
(b) $\angle ECA \cong \angle EDB$

(c) $\overline{CA} \parallel \overline{DB}$



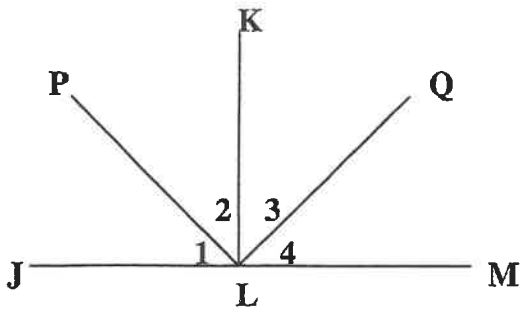
8. Given: In ΔPQR, $\angle Q$ is a right angle
$\overline{ST} \perp \overline{PR}$
$\overline{RT} \cong \overline{RQ}$

Prove: $\Delta TRS \cong \Delta QRS$



9. Given: $\angle 1 \cong \angle 4$
$\angle 2 \cong \angle 3$

Prove: $\overline{KL} \perp \overline{JM}$



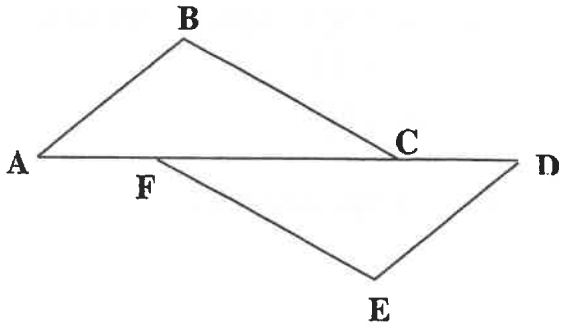
10. Given: $\overline{AFCD}$

$\overline{AB} \perp \overline{BC}$ *and* $\overline{DE} \perp \overline{EF}$

$\overline{BC} \parallel \overline{FE}$

$\overline{AB} \cong \overline{DE}$

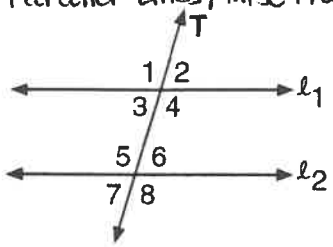
Prove: $\overline{AC} \cong \overline{DF}$



Name: _____

Geometry R: Parallel Lines, Misc Proofs

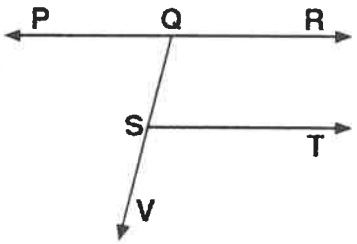
1)



$\angle 2$ and $\angle 6$ can be classified as

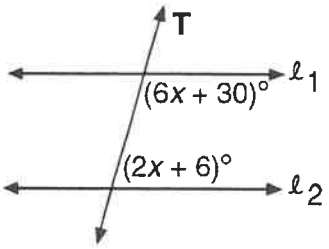
A) alternate interior angles
B) corresponding angles
C) interior angles on the same side of the transversal
D) none of these

2)



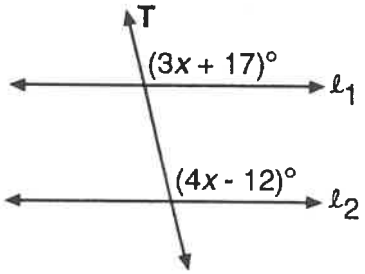
From the given figure, name a pair of alternate interior angles.

3) What is the value of x that makes $\ell_1 \parallel \ell_2$?



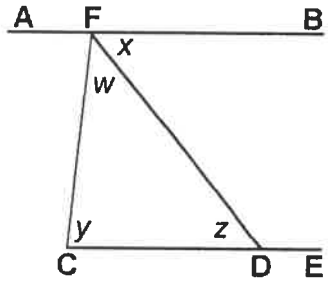
A) 18
B) -6
C) 12
D) 6

4) What is the value of x that makes $\ell_1 \parallel \ell_2$?



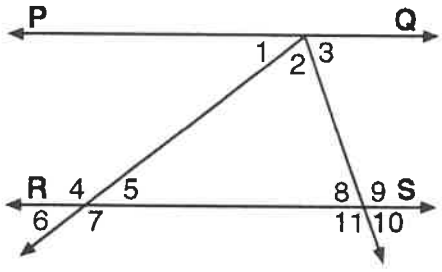
A) 26.4
B) 25
C) 29
D) 5

5) In the accompanying diagram, $\overline{AFB} \parallel \overline{CDE}$. If $\overline{FD}$ bisects $\angle CFB$, which statement is true?



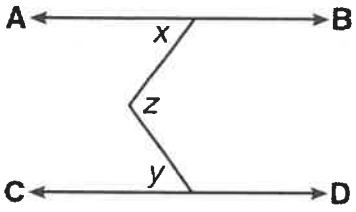
A) $\angle y \cong \angle z$
B) $\angle x \cong \angle y$
C) $\angle w \cong \angle z$
D) $\angle w \cong \angle y$

6)



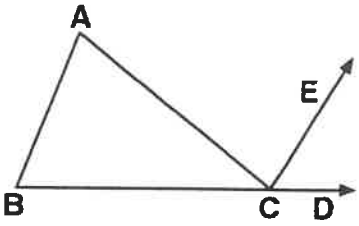
If $\overrightarrow{PQ} \parallel \overrightarrow{RS}$, $m\angle 5 = 40°$, and $m\angle 8 = 50°$, find the measures of the remaining angles in the given figure.

7) In the accompanying diagram, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, $m\angle x = 50°$, and $m\angle y = 60°$.



What is $m\angle z$?

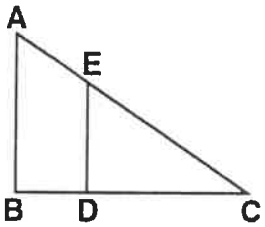
8) In the diagram below, $\overline{AB} \parallel \overline{CE}$.



If $m\angle B = 32°$ and $m\angle ACE = 80°$, find $m\angle ACB$.

Write a two column proof for each of the following

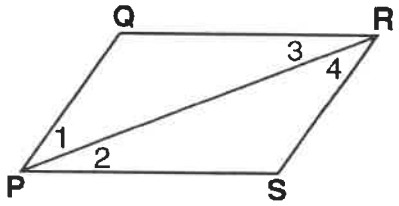
9)



Given: $\overline{AB} \perp \overline{BC}$
$\angle EDC$ is a right angle

Prove: $\overline{AB} \parallel \overline{DE}$

10)



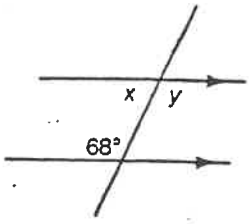
Given: $\overline{QP} \parallel \overline{RS}$
$\overline{QP} \cong \overline{RS}$

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

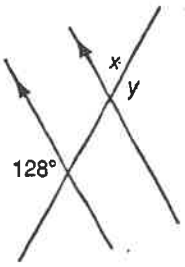
Name _____ Parallel Lines Review

1. In each of the following, find the values of x and y:

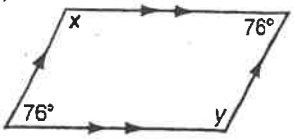
(a)



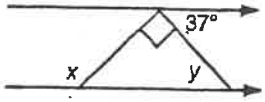
(b)



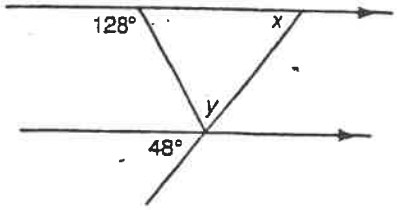
(c)



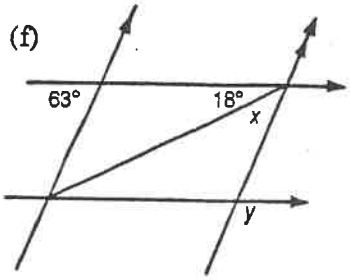
(d)



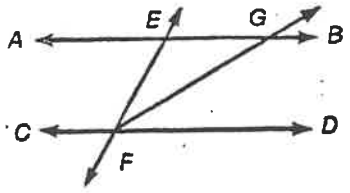
(e)



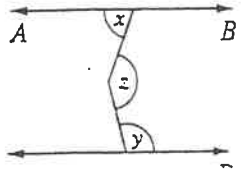
(f)



2. In the accompanying diagram, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ and $\overrightarrow{FG}$ bisects $\angle EFD$. If $m\angle EFG = x$ and $m\angle FEG = 4x$, find x.

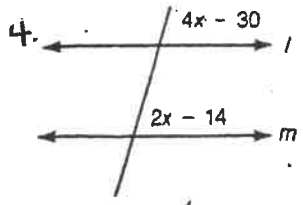


3. In the figure, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, $m\angle x = 70$, and $m\angle y = 102$. Find $m\angle z$.



Given that l ∥ m, *find the value of* x.

4.



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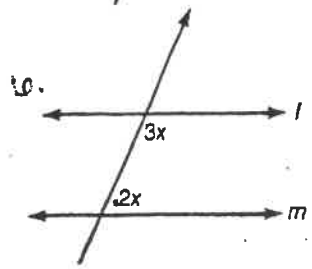

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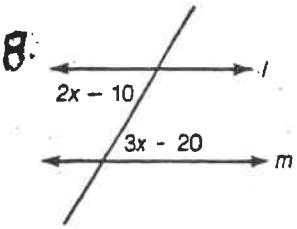

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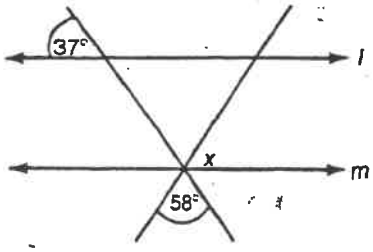
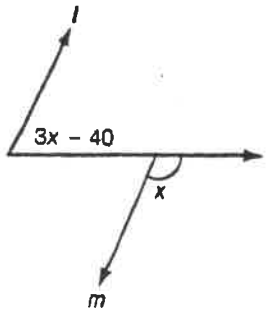


7.



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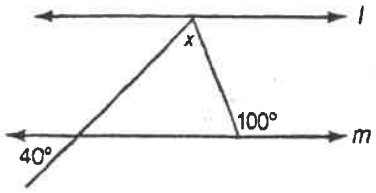
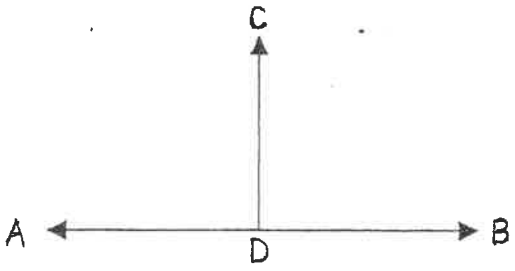


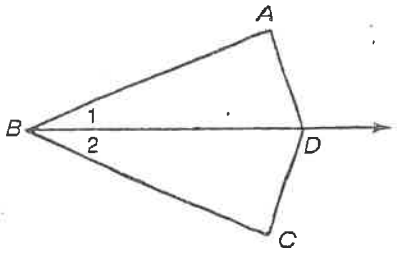
10 Given $\overline{AB}$, $m\angle ADC = 6x$ and $m\angle BDC = 9x - 45$.

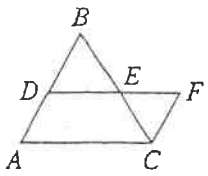
a. Find the value of x.

b. Show that $\overline{AB} \perp \overline{DC}$.



12. Given: $\overline{BA} \perp \overline{AD}$, $\overline{BC} \perp \overline{CD}$, $\overline{AD} \cong \overline{CD}$.
Prove: $\overline{BD}$ bisects $\angle ABC$.





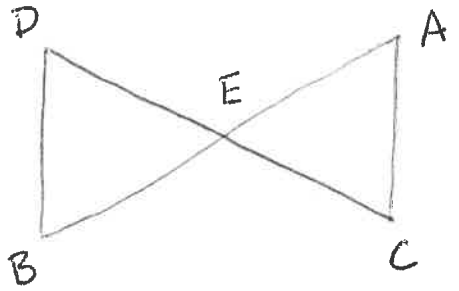
13. If E is the midpoint of $\overline{BC}$ and E is the midpoint of $\overline{DF}$, prove: $\overline{AB} \parallel \overline{FC}$.

Given $\overline{AB}$ and $\overline{CD}$ bisect each other at point E

Prove: (a) $\triangle CEA \cong \triangle DEB$

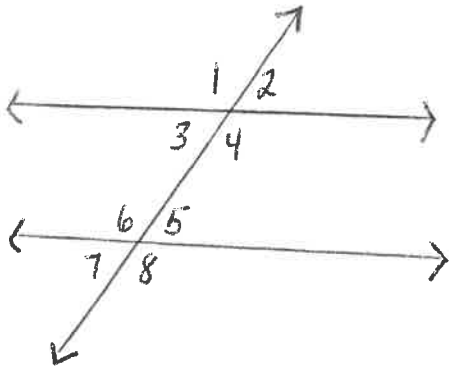
(b) $\angle ECA \cong \angle EDB$

(c) $\overline{CA} \parallel \overline{DB}$



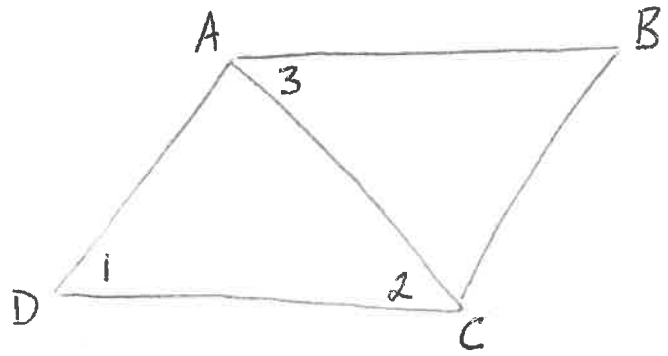
Statements	Reasons

If $m\angle 4 = 8x + 6$ and $m\angle 8 = 10x - 20$, then find the value of x



Given: $\angle 1 \cong \angle 2$, $\angle 1 \cong \angle 3$

Prove: $\overline{AB} \parallel \overline{DC}$



Statements	Reasons