

Geometry CC - Unit 6
Lesson 6: Unknown Angle Proofs
M1 L9

HW 6.5 Answers

2. Given: $\overline{BC} \cong \overline{BD}$
 $\angle C \neq \angle D$

Prove: $\angle CBA \cong \angle DBA$

S	R
① $\overline{BC} \cong \overline{BD}$	① given
② $\angle C \neq \angle D$	② given
③ $\angle CBA \cong \angle DBA$	③ Assumption
④ $\overline{AB} \cong \overline{AB}$	④ Reflexive Prop
⑤ $\triangle CAB \cong \triangle DAB$	⑤ SAS \cong SAS
⑥ $\angle C \cong \angle D$	⑥ CPCTC
⑦ $\angle CBA \not\cong \angle DBA$	⑦ Contradiction in Steps 2 & 6

Dec 8-3:28 PM

3. Given: \overline{AD} bisects $\angle CAB$
 $\overline{CD} \cong \overline{DB}$

Prove: $\triangle CAB$ is not isosceles

S	R
① \overline{AD} bisects $\angle CAB$	① given
② $\overline{CD} \cong \overline{DB}$	② given
③ $\triangle CAB$ is isosc.	③ Assumption
④ $\angle 1 \cong \angle 2$	④ Def of an \angle bisector
⑤ $\overline{CA} \cong \overline{CB}$	⑤ An isosc. \triangle has 2 \cong sides
⑥ $\overline{AD} \cong \overline{AD}$	⑥ Reflexive Prop.
⑦ $\triangle CAD \cong \triangle CBD$	⑦ SAS \cong SAS
⑧ $\overline{CD} \cong \overline{CB}$	⑧ CPCTC
⑨ $\triangle CAB$ is not isosceles	⑨ Contradiction in Steps 2 & 8

Dec 8-3:55 PM

In geometry, we follow a similar deductive thought process, much like Holmes' uses, to prove geometric claims. Let's revisit an old friend - solving for unknown angles. Remember this one?

Example: Solve for a.

Option 1:
 $78 + x = 180$
 $x = 102$
 $42 + 102 + a = 180$
 $a = 36$

Option 2:
Ext \angle thm
 $42 + a = 78$
 $a = 36$

Dec 8-3:54 PM

Given the labeled diagram at the right, can we prove that $x + y = z$ or, in other words, that the exterior angle of a triangle equals the sum of the measures of the remote interior angles.)

S	R
① $x + w + y = 180$	① Interior \angle 's of a \triangle sum to 180
② $w + z = 180$	② Linear Pairs are Supplementary
③ $x + w + y = w + z$	③ Substitution Property
④ $x + y = z$	④ Subtraction Postulate

Dec 8-3:29 PM

Practice:

1) You know that angles on a line sum to 180°. Prove that vertical angles are equal in measure.

Make a Plan:

- What do you know about w and x ? y and z ?

$w + x = 180$
 $y + x = 180$

- What conclusion can you draw based on both pieces of knowledge?

$w + x = y + x$
 $w = y$

Write out your proof.

S	R
① $\angle w + \angle x = 180$	① Linear Pairs are Supplementary
② $\angle y + \angle x = 180$	② Linear Pairs are suppl.
③ $\angle w + \angle x = \angle y + \angle x$	③ Subst. Prop
④ $\angle w = \angle y$	④ Subtraction Postulate

Dec 8-3:29 PM

2) In the diagram at the right, prove that $m\angle y + m\angle z = m\angle w + m\angle x$.

(You will need to write in a label in the diagram.)

S	R
① $\angle z + \angle y + \angle x = 180$	① Int. \angle 's of a \triangle sum to 180
② $\angle x + \angle w + \angle z = 180$	② Int. \angle 's of a \triangle sum to 180
③ $\angle z + \angle y + \angle x = \angle x + \angle w + \angle z$	③ Subst. Property
④ $m\angle y + m\angle z = m\angle w + m\angle x$	④ Subtraction Postulate

Dec 8-3:29 PM

3) In the figure at the right $\overline{AB} \parallel \overline{CD}$ and $\overline{BC} \parallel \overline{DE}$.
 Prove that $m\angle ABC = m\angle CDE$.

Given

S	R
① $\overline{AB} \parallel \overline{CD}$ & $\overline{BC} \parallel \overline{DE}$	① Given
② $\angle 1 = \angle 2$	② \parallel \rightarrow then \parallel
③ $\angle 2 = \angle 3$	③ \parallel \rightarrow then \parallel
④ $\angle 1 = \angle 3$	④ Substitution Property

Dec 8-3:30 PM

4) In the figure at the right, prove that the sum of the angles marked by arrows is 90° .

Prove:
 $a+b+c+e+f+g+j+k+m = 90^\circ$

S	R
① $a+b+c+d = 360^\circ$	① \angle 's around a pt sum to 360°
② $e+f+g+h = 360^\circ$	② \angle 's around a pt sum to 360°
③ $i+j+k+m = 360^\circ$	③ \angle 's around a pt sum to 360°
④ $d+h+i = 180^\circ$	④ Angles of a Δ sum to 180°
⑤ $a+b+c+d+e+f+g+h+i+j+k+m = 1080^\circ$	⑤ Addition Property
⑥ $a+b+c+e+f+g+j+k+m = 900^\circ$	⑥ Subtraction Property

Dec 8-3:30 PM



Dec 9-12:11 PM