

8. Given:

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

Jan 9-7:50 AM

9. Given:

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

Jan 9-7:51 AM

10. Given:

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

11. Given:  $m\angle ABC = m\angle HIJ$

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

Jan 9-7:51 AM

11. Given:

Conclusion: U is the midpoint of  $\overline{RN}$

Why: \_\_\_\_\_

12. Given:

Conclusion:  $\angle 8$  and  $\angle 9$  are vertical

Why: \_\_\_\_\_

Jan 9-7:44 AM

13. Given:  $m\angle NAT + m\angle WED = 90^\circ$   
 Conclusion:  $\angle NAT$  &  $\angle WED$  are complementary  
 Why: \_\_\_\_\_

14. Given:  $\overline{FA} \cong \overline{RM}$   
 Conclusion:  $FA = RM$   
 Why: \_\_\_\_\_

Jan 9-7:45 AM

12/1 Aim: Unknown Angle Proofs  
 Do now: Read the opening exercise and do the proof

Homework: Last page  
 Quiz tomorrow or today  
 lines and centers  
 Test Wednesday / Thursday

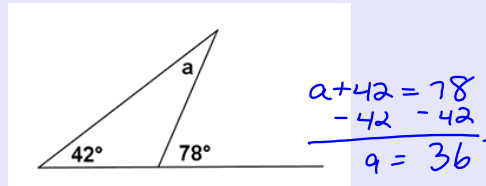
Nov 30-7:20 AM

One of the main goals in studying geometry is to develop your ability to reason critically, to draw valid conclusions based upon observations and proven facts. Master detectives do this sort of thing all the time.

Nov 30-7:20 AM

**Discussion**

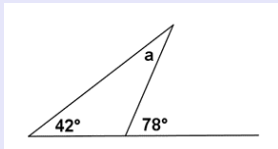
In geometry, we follow a similar deductive thought process to prove geometric claims.



Solve for a.

Nov 30-7:20 AM

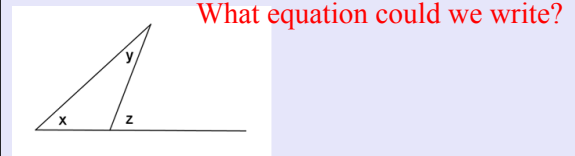
What fact allowed you to figure out the measure of a?



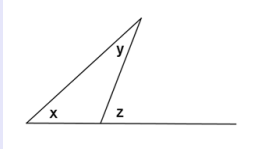
Dec 22-10:53 AM

Suppose that we rearrange the diagram just a little bit.

Instead of using numbers, we use variables to represent angle measures.



Nov 30-7:20 AM



We know that the angles of a triangle sum to 180°

\* In proofs, what Prove:  $z = x + y$   
 They want us to  
 prove is always the last line of the proof.

Nov 30-7:20 AM

Given the labeled diagram to the right, can we prove that  $x + y = z$ ?

(or that the exterior angle of a triangle equals the sum of the measures of the non-adjacent interior angles)

Basically we are going to write a proof to show that the exterior angle theorem works all the time.

Dec 22-10:53 AM

Prove:  $m\angle x + m\angle y = m\angle z$   
 To the diagram label angle  $w$ .

$x + y + w = 180^\circ$   
 $z + w = 180^\circ$   
 $x + y + w = z + w$   
 $x + y = z$

$m\angle x +$

Nov 30-7:20 AM

Proof:  
 Statements  
 1.  $m\angle x + m\angle y + m\angle w = 180$

Reasons

Why are you allowed to write this statement?  
 What can we put as a reason?

$m\angle x +$

Nov 30-7:20 AM

Proof:  
 Statements  
 1.  $m\angle x + m\angle y + m\angle w = 180$

Reasons  
 1. The sum of the angles of a triangle equals 180 degrees.

$m\angle x +$

Nov 30-7:20 AM

Are we done?  
 Is our last line what we were asked to prove?

Jan 6-6:29 AM

Dec 4-1:22 PM

Statement	Reason
① $x + y + w = 180$	① Sum of $\angle$ 's in a $\Delta = 180^\circ$
② $w + z = 180$	② Linear pair = $180^\circ$
③ $x + y + w = w + z$	③ Substitution
④ $x + y = z$	④ Subtraction

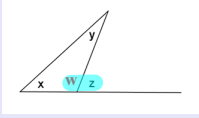
Dec 4-1:22 PM

**Proof:**

**Statements**

- $m\angle x + m\angle y + m\angle w = 180$
- $m\angle w + m\angle z = 180$

Why are you allowed to write this statement?  
What can we put as a reason?



**Reasons**

- The sum of the angles of a triangle equals 180 degrees.

$m\angle x +$

Nov 30-7:20 AM

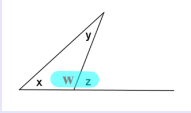
**Proof:**

**Statements**

- $m\angle x + m\angle y + m\angle w = 180$
- $m\angle w + m\angle z = 180$

**Reasons**

- The sum of the angles of a triangle equals 180 degrees.
- Two angles that form a straight line are supplementary.



$m\angle x +$

Nov 30-7:20 AM

Are we done?  
Is our last line what we were asked to prove?

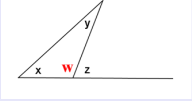
Jan 6-6:29 AM

**Proof:**

**Statements**

- $m\angle x + m\angle y + m\angle w = 180$
- $m\angle w + m\angle z = 180$
- $m\angle x + m\angle y + m\angle w = m\angle w + m\angle z$

Why are you allowed to write this statement?  
What can we put as a reason?



**Reasons**

- The sum of the angles of a triangle equals 180 degrees.
- Two angles that form a straight line are supplementary.

$m\angle x +$

Nov 30-7:20 AM

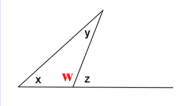
**Proof:**

**Statements**

- $m\angle x + m\angle y + m\angle w = 180$
- $m\angle w + m\angle z = 180$
- $m\angle x + m\angle y + m\angle w = m\angle w + m\angle z$

**Reasons**

- The sum of the angles of a triangle equals 180 degrees.
- Two angles that form a straight line are supplementary.
- Substitution Postulate



$m\angle x +$

Nov 30-7:20 AM

Are we done?  
Is our last line what we were asked to prove?

Jan 6-6:29 AM

Proof:

<p>Statements</p> <ol style="list-style-type: none"> <li><math>m\angle x + m\angle y + m\angle w = 180</math></li> <li><math>m\angle w + m\angle z = 180</math></li> <li><math>m\angle x + m\angle y + m\angle w = m\angle w + m\angle z</math></li> <li><math>m\angle x + m\angle y = m\angle z</math></li> </ol> <p>Why are you allowed to write this statement? What can we put as a reason?</p>	<p>Reasons</p> <ol style="list-style-type: none"> <li>The sum of the angles of a triangle equals 180 degrees.</li> <li>Two angles that form a straight line are supplementary</li> <li>Substitution Postulate</li> </ol>
---	--

$m\angle x +$

Nov 30-7:20 AM

Proof:

<p>Statements</p> <ol style="list-style-type: none"> <li><math>m\angle x + m\angle y + m\angle w = 180</math></li> <li><math>m\angle w + m\angle z = 180</math></li> <li><math>m\angle x + m\angle y + m\angle w = m\angle w + m\angle z</math></li> <li><math>m\angle x + m\angle y = m\angle z</math></li> </ol>	<p>Reasons</p> <ol style="list-style-type: none"> <li>The sum of the angles of a triangle equals 180 degrees.</li> <li>Two angles that form a straight line are supplementary</li> <li>Substitution Postulate</li> <li>Subtraction Postulate</li> </ol>
--	---

$m\angle x +$

Nov 30-7:20 AM

Are we done?  
Is our last line what we were asked to prove?

Jan 6-6:29 AM

Notice that each step in the proof was justified by a previously known or demonstrated fact. We end up with a newly proven fact (that an exterior angle of any triangle is the sum of the measures of the non-adjacent interior angles of the triangle). This ability to identify the steps used to reach a conclusion based on known facts is *deductive reasoning*

Nov 30-7:20 AM

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  $\angle w$  and  $\angle x$ ?  $\angle y$  and  $\angle z$ ?  
 $w + x = 180^\circ$        $y + x = 180^\circ$
- What conclusion can you draw based on both pieces of knowledge?  
 ~~$w + x = 180^\circ$~~        ~~$y + x = 180^\circ$~~

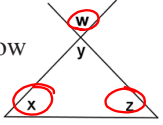
Nov 30-7:20 AM

Write out your proof:

Statements	Reasons
① $w + x = 180^\circ$	① A linear pair sums to 180°
② $x + y = 180^\circ$	② " "
③ $w + x = x + y$	③ Substitution
④ $w = y$	④ Subtraction

Nov 30-7:20 AM

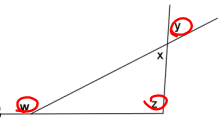
2. Given the diagram to the right, prove that  $m\angle w + m\angle x + m\angle z = 180$ .  
 (Make a plan first. What do you know about  $\angle x$ ,  $\angle y$ , and  $\angle z$ ?)



Statements	Reasons
① $x + y + z = 180$	① $\angle$ 's in a $\Delta$ add to 180
② $w = y$	② Intersecting lines form $\cong$ vertical $\angle$ 's
③ $x + w + z = 180$	③ Substitution

Nov 30-7:20 AM

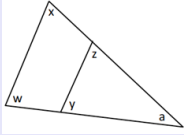
3. Given the diagram to the right, prove that  $m\angle w = m\angle y + m\angle z$ .



Statements	Reasons
① $w = x + z$	① Exterior $\angle =$ sum of remote interior $\angle$ 's
② $y = x$	② Intersecting lines form $\cong$ vertical $\angle$ 's.
③ $w = y + z$	③ Substitution

Nov 30-7:20 AM

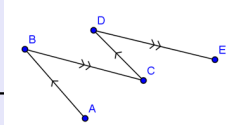
4. In the diagram to the right, prove that  $m\angle y + m\angle z = m\angle w + m\angle x$ .  
 (You need to write a label in the diagram that is not labeled yet for this proof.)



Statements	Reasons

Nov 30-7:20 AM

5. In the figure to the right,  $AB \parallel CD$  and  $BC \parallel DE$ .  
 Prove that  $m\angle ABC = m\angle CDE$ .

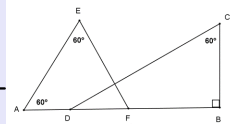


Statements	Reasons

Nov 30-7:20 AM

6. In the figure to the right, prove that DC perpendicular to EF.

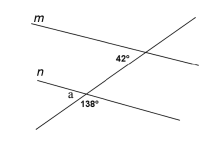
Draw in label Z



Statements	Reason

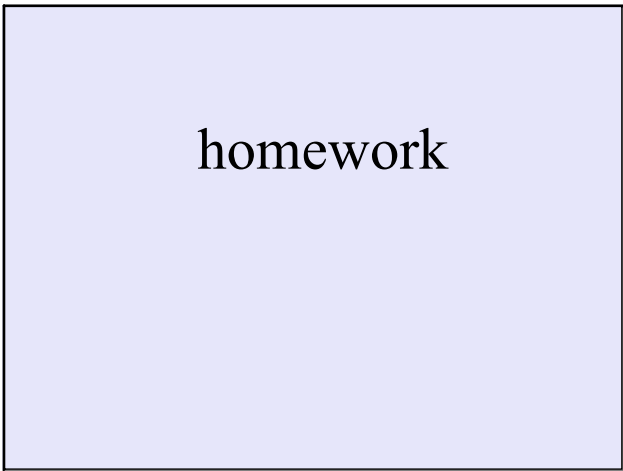
Nov 30-7:20 AM

8. In the figure to the right, prove that  $m \parallel n$ .



Statements	Reasons

Nov 30-7:20 AM



Nov 30-8:05 AM



Nov 30-8:05 AM



Nov 30-8:05 AM



Nov 30-8:05 AM



Nov 30-8:05 AM



Nov 30-8:05 AM