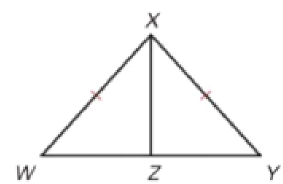
Classwork 2.4 Proofs

1. Given: $\overline{WX} \cong \overline{YX}$, Z is the midpoint of $\overline{WY}$
   Prove: $\triangle WXZ \cong \triangle YXZ$

<u>Place the following items in as one of the reasons below:</u>
Given
Definition of a midpoint
Given
Reflexive Property
SSS Congruence Postulate

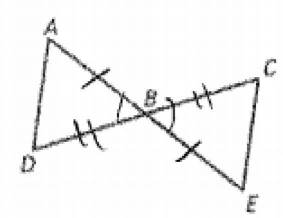
Statements	**Reasons**
1) $\overline{WX} \cong \overline{YX}$	
2) Z is the midpoint of $\overline{WY}$	
3) $\overline{WZ} \cong \overline{ZY}$	
4) $\overline{XZ} \cong \overline{XZ}$	
5) $\triangle WXZ \cong \triangle YXZ$	



2. Using the two column proof above in #1, write a paragraph proof to *Prove*: $\triangle WXZ \cong \triangle YXZ$

3. Given: B is the midpoint of $\overline{AE}$, B is the midpoint of $\overline{CD}$
   Prove: $\triangle ABD \cong \triangle EBC$

<u>Place the following items in as one of the statements or reasons below</u>:
Given
$\overline{AB} \cong \overline{EB}$
Given
$\overline{BD} \cong \overline{BC}$
Vertical Angles are Congruent
SAS Congruence Postulate



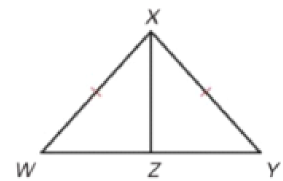
Statements	**Reasons**
1) B is the midpoint of $\overline{AE}$	
2)	Definition of Midpoint
3) B is the midpoint of $\overline{CD}$	
4)	Definition of Midpoint
5) <ABD ≅ <EBC	
6) $\triangle ABD \cong \triangle EBC$	

Classwork 2.4 Proofs **Solutions**

1. Given: $\overline{WX} \cong \overline{YX}$, Z is the midpoint of $\overline{WY}$
   Prove: △WXZ ≅ △YXZ

Place the following items in as one of the reasons below:
Given
Definition of a midpoint
Given
Reflexive Property
SSS Congruence Postulate

Statements	Reasons
1) $\overline{WX} \cong \overline{YX}$	Given
2) Z is the midpoint of $\overline{WY}$	Given
3) $\overline{WZ} \cong \overline{ZY}$	Definition of a midpoint
4) $\overline{XZ} \cong \overline{XZ}$	Reflexive Property
5) △WXZ ≅ △YXZ	SSS Congruence Postulate

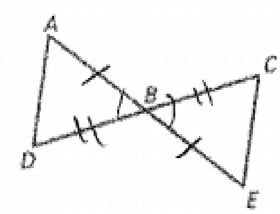


2. Using the two column proof above in #1, write a paragraph proof to *Prove*: △WXZ ≅ △YXZ

It is given that $\overline{WX}$ is congruent to $\overline{YX}$ and that Z is the midpoint of $\overline{WY}$. Therefore based on the definition of a midpoint, point Z bisects WY into two equal parts. Therefore $\overline{WZ}$ is congruent to $\overline{ZY}$. In addition $\overline{XZ}$ is congruent to $\overline{XZ}$ as the line is shared with both triangles, therefore using the reflexive property the line is congruent. Therefore using the Side-Side-Side Congruence Postulate, it can be determined that △WXZ is congruent △YXZ as three sides of one triangle is congruent to three corresponding sides of the other triangle.

3. Given: B is the midpoint of $\overline{AE}$, B is the midpoint of $\overline{CD}$
   Prove: △ABD ≅ △EBC

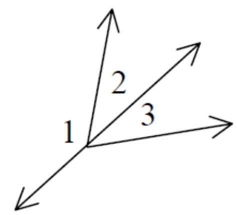
Place the following items in as one of the statements or reasons below:
Given
$\overline{AB} \cong \overline{EB}$
Given
$\overline{BD} \cong \overline{BC}$
Vertical Angles are Congruent
SAS Congruence Postulate



Statements	Reasons
1) B is the midpoint of $\overline{AE}$	Given
2) $\overline{AB} \cong \overline{EB}$	Definition of Midpoint
3) B is the midpoint of $\overline{CD}$	Given
4) $\overline{BD} \cong \overline{BC}$	Definition of Midpoint
5) <ABD ≅ <EBC	Vertical Angles are Congruent
6) △ABD ≅ △EBC	SAS Congruence Postulate

Classwork 2.4 Proofs (Page 2)

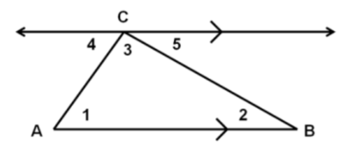
4. Given: $\angle 1$ and $\angle 2$ are supplementary. $\angle 2 \cong \angle 3$



Prove: $\angle 1 + \angle 3 = 180^0$

Statements	**Reasons**
1)	
2)	
3)	
4)	

5. Given: The top line is running parallel to the base of the triangle.



Prove: $\angle 1 + \angle 2 + \angle 3 = 180^0$

Statements	**Reasons**
1)	
2)	
3)	
4)	
5)	

6. Given: $\angle NLM \cong \angle LNO$ and $\angle OLN \cong \angle MNL$

Prove: $\angle M \cong \angle O$

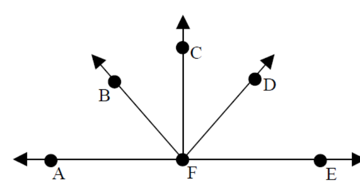
Statements	Reasons
1)	
2)	
3)	
4)	
5)	

7. Given: $\angle AFB$ is complementary to $\angle BFC$.

$\angle EFD$ is complementary to $\angle DFC$. $\angle BFC \cong \angle DFC$

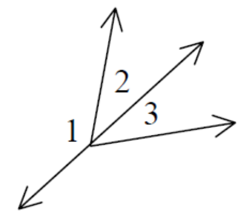
Prove: $\angle AFB \cong \angle EFD$

Statements	**Reasons**
1)	
2)	
3)	
4)	
5)	
6)	
7)	
8)	



8. Using the two column proof above in #7, write a paragraph proof to *Prove*: $\angle AFB \cong \angle EFD$

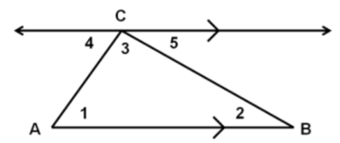
4. Given: $\angle 1$ and $\angle 2$ are supplementary. $\angle 2 \cong \angle 3$



Prove: $\angle 1 + \angle 3 = 180^0$

Statements	Reasons
1) $\angle 1$ and $\angle 2$ are supplementary	Given
2) $\angle 1 + \angle 2 = 180^o$	Definition of Supplementary angles
3) $\angle 2 \cong \angle 3$	Given
4) $\angle 1 + \angle 3 = 180^o$	Substitution

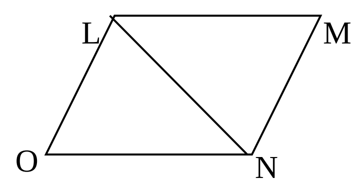
5. Given: The top line is running parallel to the base of the triangle.



Prove: $\angle 1 + \angle 2 + \angle 3 = 180^0$

Statements	Reasons
1) Top line parallel to base of triangle	Given
2) $\angle 4 \cong \angle 1$	Alternate Interior Angles
3) $\angle 5 \cong \angle 2$	Alternate Interior Angles
4) $\angle 4 + \angle 5 + \angle 3 = 180^o$	Definition of straight angle
5) $\angle 1 + \angle 2 + \angle 3 = 180^o$	Substitution

6. Given: $\angle NLM \cong \angle LNO$ and $\angle OLN \cong \angle MNL$

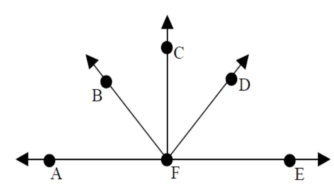


Prove: $\angle M \cong \angle O$

Statements	Reasons
1) $\angle NLM \cong \angle LNO$	Given
2) $\angle OLN \cong \angle MNL$	Given
3) $\overline{LN} \cong \overline{LN}$	Reflexive Property
4) $\triangle NLM \cong \triangle LNO$	ASA Congruence Postulate
5) $\angle M \cong \angle O$	CPCTC

7. Given: $\angle AFB$ is complementary to $\angle BFC$.
$\angle EFD$ is complementary to $\angle DFC$. $\angle BFC \cong \angle DFC$

Prove: $\angle AFB \cong \angle EFD$



Statements	Reasons
1) $\angle AFB$ is complementary to $\angle BFC$	Given
2) $\angle AFB + \angle BFC = 90^o$	Definition of complementary angles
3) $\angle EFD$ is complementary to $\angle DFC$	Given
4) $\angle EFD + \angle DFC = 90^o$	Definition of complementary angles
5) $\angle BFC \cong \angle DFC$	Given
6)) $\angle EFD + \angle BFC = 90^o$	Substitution
7) $\angle AFB + \angle BFC = \angle EFD + \angle BFC$	Transitive Property
8) $\angle AFB \cong \angle EFD$	Substitution

8. Using the two column proof above in #7, write a paragraph proof to *Prove*: $\angle AFB \cong \angle EFD$

It is given that angle AFB is complementary to angle BFC and that angle EFD is complementary to angle DFC which means that these pairs add to 90 degrees. In addition, it is given that angle BFC is congruent to angle DFC. Therefore by using substitution you can replace angle DFC with BFC and then using the Transitive Property which says if the sum of angle EFD and angle BFC equal 90 degrees then angle the sum of angle AFB and BFC are also equal to the sum of angle EFD and angle BFC then $\angle AFB \cong \angle EFD$.