Ch 1.6 - Reinforce Two Column Proofs

Objectives:

Write **Two Column Proofs**

Agenda:

1) DO NOW: Fill in the black Proof
2) Check HW - Questions?
3) Together: Angle Proof (Textbook p. 36 #2)
4) Individual: Practice With Proofs
   Level 1 & Level 2

HW: ***p. 37 # 4, 9, 10, 11a, (12 challenge)***

Definitions/Theorems for Section 7 (1.7)

Properties of Equality

Addition Property	If $a = b$, then $a + c = b + c$.
Subtraction Property	If $a = b$, then $a - c = b - c$.
Multiplication Property	If $a = b$, then $a \cdot c = b \cdot c$.
Division Property	If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.
Reflexive Property	$a = a$
Symmetric Property	If $a = b$, then $b = a$.
Transitive Property	If $a = b$ and $b = c$, then $a = c$.
Substitution Property	If $a = b$, then b can replace a in any expression.

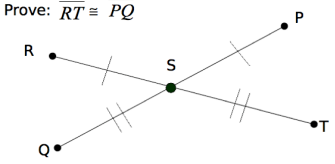
Properties of Equality

DO NOW:

Group 1

Given: $\overline{RS} \cong \overline{PS}$; $\overline{ST} \cong \overline{SQ}$

Prove: $\overline{RT} \cong \overline{PQ}$



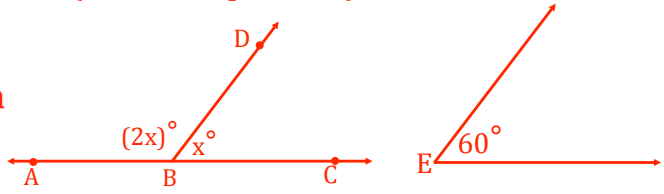
STATEMENTS	REASONS
1. $\overline{RS} \cong \overline{PS}$; $\overline{ST} \cong \overline{SQ}$	1. _____
2. $\overline{RS} + \overline{ST} = \overline{PS} + \overline{SQ}$	2. _____
3. $\overline{RS} + \overline{ST} = \overline{RT}$; $PS + SQ = \overline{PQ}$	3. _____
4. $\overline{RT} \cong PQ$	4. _____

Together: Angle Proof (Textbook p. 36 #2)

Sample Problems

(2) Given: Diagram Shown

Prove: <DBC ≅<E

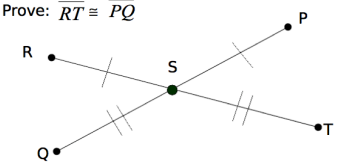


DO NOW:

Group 1

Given: $\overline{RS} \cong \overline{PS}$; $\overline{ST} \cong \overline{SQ}$

Prove: $\overline{RT} \cong \overline{PQ}$



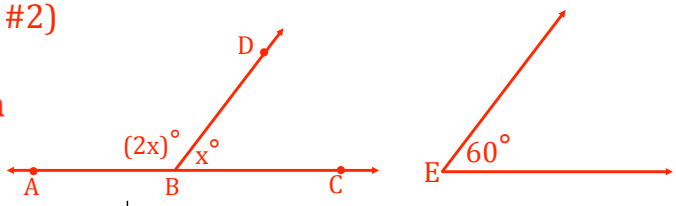
STATEMENTS	REASONS
1. $\overline{RS} \cong \overline{PS}$; $\overline{ST} \cong \overline{SQ}$	1. Given
2. $\overline{RS} + \overline{ST} = \overline{PS} + \overline{SQ}$	2. Addition property of Equality
3. $\overline{RS} + \overline{ST} = \overline{RT}$; $PS + SQ = PQ$	3. Segment Addition
4. $\overline{RT} \cong PQ$	4. Transitive property of Equality

Angle Proof (Textbook p. 36 #2)

Sample Problems

(2) Given: Diagram Shown

Prove: <DBC ≅ <E



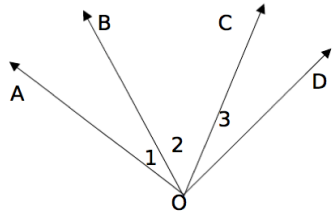
Statements	*Reasons*
1) <ABD = 2x° < DBC = x° < E = 60°	*1) Given*
2) <ABC is a straight angle	*2) Diagram*
3) <ABC = 180°	*3) If an angle is a straight angle, then its measure is 180° (by definition)*
4) <ABD + <DBC = <ABD	*4) Diagram (adjacent supplementary angles)*
5) 2x + x = 180	*5) Substitution*
6) 3x = 180	*6) Addition property of equality*
7) x = 60	*7) Multiplication property of equality*
8) <DBC ≅ < E	*8) Transitive property of equality*

Level 1

Group 2

Given: m∠AOC = m∠BOD

Prove: m∠1 = m∠3

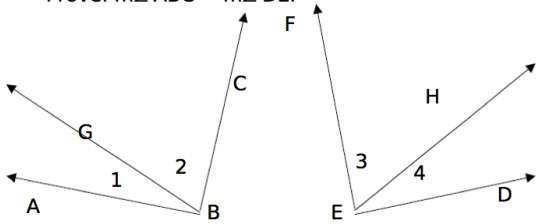


STATEMENTS	REASONS
1. m∠AOC = m∠BOD	1. _____
2. m∠AOC = m∠1 + m∠2; m∠BOD = m∠2 + m∠3	2. _____
3. m∠1 + m∠2 = m∠2 + m∠3	3. _____
4. m∠2 = m∠2	4. _____
5. m∠1 = m∠3	5. _____

Group 3

Given: m∠1 = m∠3; m∠2 = m∠4

Prove: m∠ABC = m∠DEF



STATEMENTS	REASONS
1. m∠1 = m∠3; m∠2 = m∠4	1. _____
2. m∠1 + m∠2 = m∠3 + m∠4	2. _____
3. m∠1 + m∠2 = m∠ABC; m∠2 + m∠3 = m∠DEF	3. _____
4. m∠ABC = m∠DEF	4. _____

Group 4

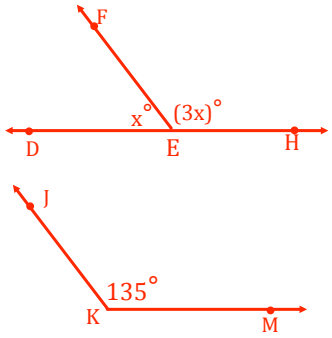
Given: $\overline{ST} \cong \overline{RN}$; $\overline{IT} \cong \overline{RU}$

Prove: $\overline{SI} \cong \overline{UN}$

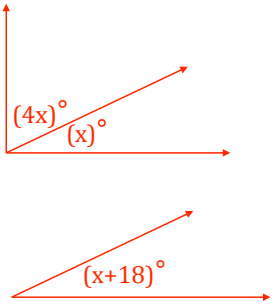
STATEMENTS	REASONS
1. $\overline{ST} \cong \overline{RN}$	1. _____
2. $\overline{ST} = \overline{SI} + \overline{IT}$ $\overline{RN} = \overline{RU} + \overline{UN}$	2. _____
3. $\overline{SI} + \overline{IT} = \overline{RU} + \overline{UN}$	3. _____
4. $\overline{IT} = \overline{RU}$	4. _____
5. $\overline{SI} \cong \overline{UN}$	5. _____

Level 2 (Similar to Textbook HW)

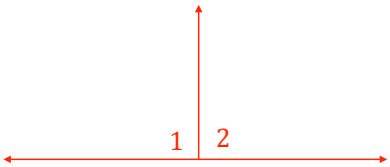
(2) Given: Diagram shown
Prove: <FEH≅<JKM



(3) Given: Diagram shown
<OPT = 90°
Prove: The measure of
<VAY is twice that of <RPT



(7) Prove that if <1 ≅ < 2,
they are both right angles.



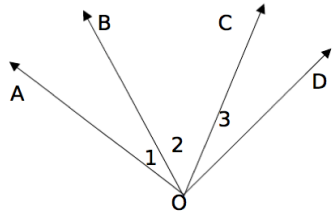
HW: *p. 37 # 4, 9, 10, 11a, (12 challenge)*
Definitions/Theorems for Section 7 (1.7)

Level 1

Group 2

Given: $m\angle AOC = m\angle BOD$

Prove: $m\angle 1 = m\angle 3$

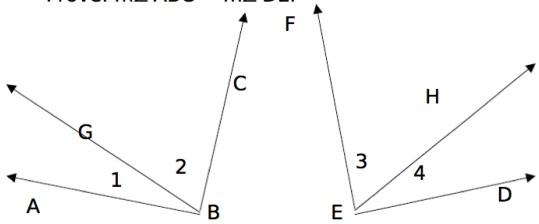


STATEMENTS	REASONS
1. $m\angle AOC = m\angle BOD$	1. Given
2. $m\angle AOC = m\angle 1 + m\angle 2$; $m\angle BOD = m\angle 2 + m\angle 3$	2. Angle Addition
3. $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$	3. Transitive P.O.E.
4. $m\angle 2 = m\angle 2$	4. Reflexive P.O.E.
5. $m\angle 1 = m\angle 3$	5. Subtraction P.O.E.

Group 3

Given: $m\angle 1 = m\angle 3$; $m\angle 2 = m\angle 4$

Prove: $m\angle ABC = m\angle DEF$

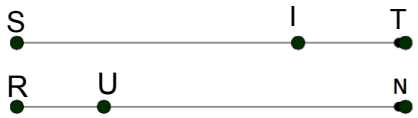


STATEMENTS	REASONS
1. $m\angle 1 = m\angle 3$; $m\angle 2 = m\angle 4$	1. Given
2. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	2. Addition P.O.E.
3. $m\angle 1 + m\angle 2 = m\angle ABC$; $m\angle 2 + m\angle 3 = m\angle DEF$	3. Angle Addition
4. $m\angle ABC = m\angle DEF$	4. Transitive P.O.E.

Group 4

Given: $\overline{ST} \cong \overline{RN}$; $\overline{IT} \cong \overline{RU}$

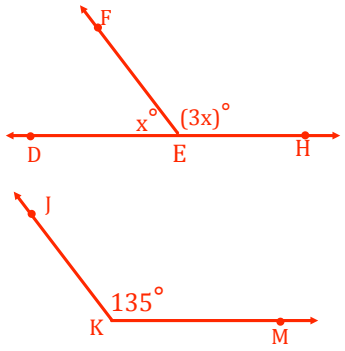
Prove: $\overline{SI} \cong \overline{UN}$



STATEMENTS	REASONS
1. $\overline{ST} \cong \overline{RN}$	1. Given
2. $\overline{ST} = \overline{SI} + \overline{IT}$ $\overline{RN} = \overline{RU} + \overline{UN}$	2. Segment Addition
3. $\overline{SI} + \overline{IT} = \overline{RU} + \overline{UN}$	3. Transitive P.O.E.
4. $\overline{IT} = \overline{RU}$	4. Given
5. $\overline{SI} \cong \overline{UN}$	5. Subtraction P.O.E.

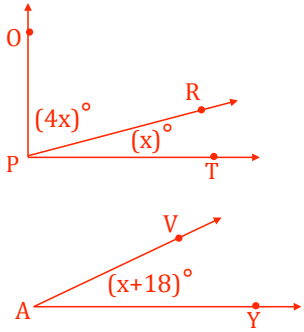
Level 2 (Similar to Textbook HW)

(2) Given: Diagram shown
Prove: <FEH≅<JKM



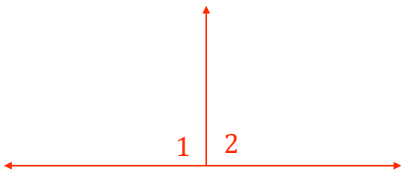
Statements	Reasons
1) <FEH = 3x <FED = x <JKM = 135	1) Given
2) <DEH is a straight angle	2) Diagram
3) <DEH = 180	3) If an angle is straight, then its measure is 180 (by definition)
4) <FED + <FEH =<DEH	4) Angle addition
5) 3x + x = 180	5) Substitution POE
6) 4x = 180	6) Addition POE
7) x= 45	7) Division POE
8) <FEH = 3(45) = 135	8) Substitution/Multiplication POE
9) <FEH ≅ <JKM	9) If angles have the same measure, then they are congruent (by definition)

(3) Given: Diagram shown
<OPT = 90°
Prove: The measure of <VAY is twice that of <RPT



Statements	Reasons
1) <OPT = 90, <OPR= 4x <RPT = x, <VAY = x + 18	1) Given
2) <OPR +<RPT = <OPT	2) Angle Addition
3) 4x + x = 90	3) Substitution
4) 5x = 90	4) Addition POE
5) x = 18	5) Division POE
6) <RPT = 18	6) Transitive POE
7) 2(<RPT) = 2(18) = 36	7) Multiplication POE
8) <VAY = 18+18 = 36	8) Substitution/Addition POE
9) <VAY= 2(<RPT)	9) Transitive POE
10) <VAY is twice that of <RPT	10) See #9

(7) Prove that if <1 ≅ < 2, they are both right angles.



Statements	Reasons
1) <1 ≅ <2	1) Given
2) < 1 + <2 is a straight angle	2) Angle Addition/ Adjacent Supplementary angles
3) <1 + <2 = 180	3) If an angle is a straight angle, then it is 180 (by definition)
4) <1 + <1 = 180	4) Substitution
5) 2(<1) = 180	5) Addition POE
6) <1 = 90	6) Division POE
7) <2 = 90	7) Transitive POE
8) <1 and <2 are both right angles	8) If an angle has a measure of 90, then it is a right angle (by definition)