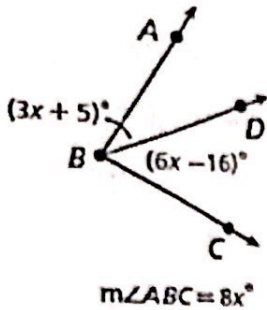


Day 5 - Intro to Algebraic Proofs - Practice

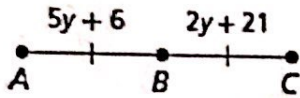
1. Given: $m\angle ABD = 3x + 5$
 $m\angle DBC = 6x - 16$
 $m\angle ABC = 8x$



Prove: $x = 11$

	Statement		Reason
1	$m\angle ABD = 3x + 5$	1	Given
2	$m\angle DBC = 6x - 16$	2	Given
3	$m\angle ABC = 8x$	3	Given
4	$m\angle ABD + m\angle DBC = m\angle ABC$	4	Angle Addition
5	$3x + 5 + 6x - 16 = 8x$	5	Substitution
6	$9x - 11 = 8x$	6	Combine Like Terms
7	$-11 = -x$	7	Subtraction Prop
8	$11 = x$	8	Division Prop
9	$x = 11$	9	Symmetric Prop

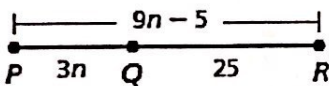
2. Given: B is the midpoint of AC.



Prove: $y = 5$

	Statement		Reason
1	B is midpoint of AC	1	Given
2	$\overline{AB} \cong \overline{BC}$	2	Definition of Midpoint
3	$AB = BC$	3	\cong segments \rightarrow = measures
4	$5y + 6 = 2y + 21$	4	Substitution Prop
5	$3y + 6 = 21$	5	Subtraction Prop
6	$3y = 15$	6	Subtraction Prop
7	$y = 5$	7	Division Prop

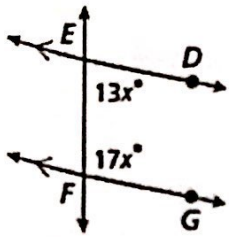
3. Given: $m\overline{PR} = 9n - 5$
 $m\overline{PQ} = 3n$
 $m\overline{QR} = 25$



Prove: $n = 5$

	Statement		Reason
1	$PR = 9n - 5$	1	Given
2	$PQ = 3n$	2	Given
3	$QR = 25$	3	Given
4	$\overline{PQ} + \overline{QR} = \overline{PR}$	4	Segment Addition
5	$3n + 25 = 9n - 5$	5	Substitution
6	$-6n + 25 = -5$	6	Subtraction Prop
7	$-6n = -30$	7	Subtraction Prop
8	$n = 5$	8	Division Prop

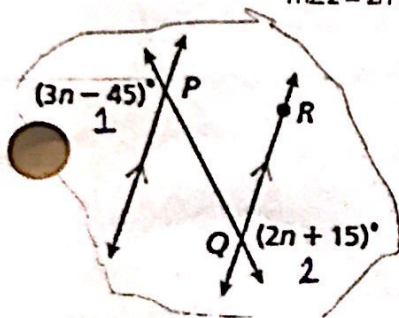
Given: $m\angle DEF = 13x$
 $m\angle EFG = 17x$



Prove: $x = 6$

	Statement		Reason
1	$m\angle DEF = 13x$	1	Given
2	$m\angle EFG = 17x$	2	Given
★ 3	$\angle DEF$ & $\angle GFE$ are same side interior \angle 's	3	Given / Diagram
4	$\angle DEF + \angle GFE = 180^\circ$	4	Same side int \angle 's are supp
5	$13x + 17x = 180$	5	Substitution
6	$30x = 180$	6	Combine Like Terms
7	$x = 6$	7	Division Prop

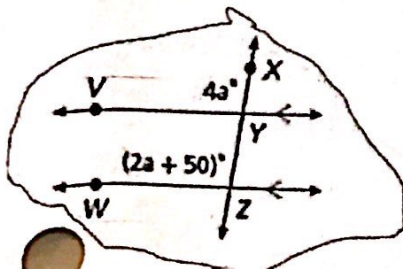
5. Given: $m\angle 1 = 3n - 45$
 $m\angle 2 = 2n + 15$



Prove: $n = 60$

	Statement		Reason
1	$m\angle 1 = 3n - 45$	1	Given
2	$m\angle 2 = 2n + 15$	2	Given
★ 3	$\angle 1$ & $\angle 2$ are alt ext \angle 's	3	Given / Diagram
4	$\angle 1 \cong \angle 2$	4	Alt ext \angle 's are \cong
5	$m\angle 1 = m\angle 2$	5	$\cong \angle$'s \rightarrow = measures
6	$3n - 45 = 2n + 15$	6	Substitution
7	$n - 45 = 15$	7	Subtraction Prop
8	$n = 60$	8	Addition Prop

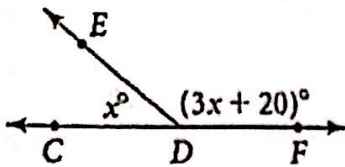
6. Given: $m\angle VYX = 4a$
 $m\angle WZY = 2a + 50$



Prove: $a = 25$

	Statement		Reason
1	$m\angle VYX = 4a$	1	Given
2	$m\angle WZY = 2a + 50$	2	Given
★ 3	$\angle VYX$ and $\angle YZW$ are corresponding \angle 's	3	Given / Diagram
4	$\angle VYX \cong \angle YZW$	4	Corr \angle 's are \cong
5	$m\angle VYX = m\angle YZW$	5	$\cong \angle$'s \rightarrow = measures
6	$4a = 2a + 50$	6	Substitution
7	$2a = 50$	7	Subtraction Prop
8	$a = 25$	8	Division Prop

7. Given: $\angle CDF$ is a straight angle

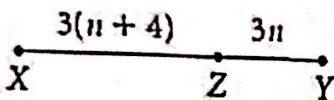


Prove: $x = 40$

Could also use linear pair in your statements.

STATEMENTS	REASONS
① $\angle CDF$ is a straight \angle	① Given
② $m\angle CDF = 180^\circ$	② Definition of straight \angle
③ $m\angle CDE + m\angle EDF = m\angle CDF$	③ Angle Addition
④ $m\angle CDE + m\angle EDF = 180^\circ$	④ Substitution/Transitive (2,3)
⑤ $x + 3x + 20 = 180$	⑤ Substitution
⑥ $4x + 20 = 180$	⑥ Combine Like Terms
⑦ $4x = 160$	⑦ Subtraction Prop
⑧ $x = 40$	⑧ Division Prop

8. Given: $m\overline{XY} = 42$

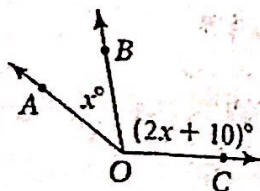


Prove: $n = 5$

not needed \leftarrow

STATEMENTS	REASONS
① $xy = 42$	① Given
② $xz = 3(n+4)$	② Given / Diagram
③ $zy = 3n$	③ Given / Diagram
④ $xz + zy = xy$	④ Segment Addition
⑤ $3(n+4) + 3n = 42$	⑤ Substitution
⑥ $3n + 12 + 3n = 42$	⑥ Distributive Prop
⑦ $6n + 12 = 42$	⑦ Combine Like Terms
⑧ $6n = 30$	⑧ Subtraction Prop
⑨ $n = 5$	⑨ Division Prop

9. Given: $m\angle AOC = 139^\circ$

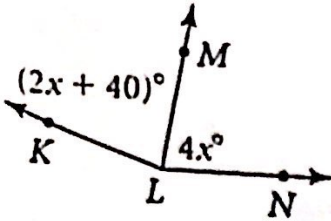


Prove: $x = 43$

not needed \leftarrow

STATEMENTS	REASONS
① $m\angle AOC = 139$	① Given
② $m\angle AOB = x$	② Given / Diagram
③ $m\angle BOC = 2x + 10$	③ Given / Diagram
④ $m\angle AOB + m\angle BOC = m\angle AOC$	④ Angle Addition
⑤ $x + 2x + 10 = 139$	⑤ Substitution
⑥ $3x + 10 = 139$	⑥ Combine Like Terms
⑦ $3x = 129$	⑦ Subtraction Prop
⑧ $x = 43$	⑧ Division Prop

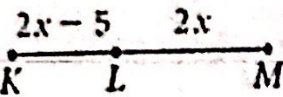
Given: \overline{LM} bisects $\angle KLN$



Prove: $x = 20$

STATEMENTS	REASONS
① \overline{LM} bisects $\angle KLN$	① Given
② $\angle KLM \cong \angle MLN$	② Definition of bisector
③ $m\angle KLM = m\angle MLN$	③ $\cong \angle$'s \rightarrow = measures
④ $2x + 40 = 4x$	④ Substitution
⑤ $40 = 2x$	⑤ Subtraction Prop of =
⑥ $20 = x$	⑥ Division Prop of =
⑦ $x = 20$	⑦ Symmetric Prop

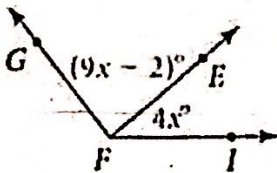
11. Given: $\overline{KM} = 35$



Prove: $\overline{KL} = 15$

STATEMENTS	REASONS
① $KM = 35$	① Given
② $KL + LM = KM$	② Segment Addition
③ $2x - 5 + 2x = 35$	③ Substitution
④ $4x - 5 = 35$	④ CLT
⑤ $4x = 40$	⑤ Addition Prop of =
⑥ $x = 10$	⑥ Division Prop of =
⑦ $KL = 2x - 5$	⑦ Given / Diagram
⑧ $KL = 2(10) - 5$	⑧ Substitution
⑨ $KL = 15$	⑨ Simplify

12. Given: $m\angle GFI = 128^\circ$



Prove: $m\angle EFI = 40^\circ$

STATEMENTS	REASONS
① $m\angle GFI = 128^\circ$	① Given
② $m\angle GFE + m\angle EFI = m\angle GFI$	② Angle Addition
③ $9x - 2 + 4x = 128$	③ Substitution
④ $13x - 2 = 128$	④ CLT
⑤ $13x = 130$	⑤ Addition Prop of =
⑥ $x = 10$	⑥ Division Prop of =
⑦ $m\angle EFI = 4x$	⑦ Given / Diagram
⑧ $m\angle EFI = 4(10)$	⑧ Substitution
⑨ $m\angle EFI = 40^\circ$	⑨ Simplify