Math 2

Unit 5.6 Using Proofs to Prove: Algebraically, Parallel Lines & Angles, & Triangle Congruency

Construct a two-column proof by completing all of the reasons.

1.) Given: $3 - 2x = 17$
Prove: $x = -7$

Statements	Reasons
1.) $3 - 2x = 17$	
2.) $-2x = 14$	
3.) $x = -7$	

2.) Given: $\frac{1}{2}x - 5 = 10$
Prove: $x = 30$

Statements	Reasons
1.) $\frac{1}{2}x - 5 = 10$	
2.) $x - 10 = 20$	
3.) $x = 30$	

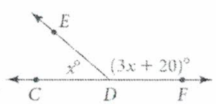
3.) Given: $5(x + 3) = -5$
Prove: $x = -4$

Statements	Reasons
1.) $5(x + 3) = -5$	
2.) $5x + 15 = -5$	
3.) $5x = -20$	
4.) $x = -4$	

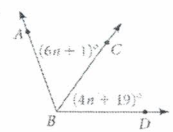
4.) Given: $\frac{2x+6}{3} = 4$
Prove: $x = 3$

Statements	Reasons
1.) $\frac{2x+6}{3} = 4$	
2.) $2x + 6 = 12$	
3.) $2x = 6$	
4.) $x = 3$	

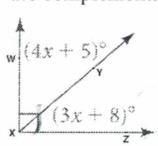
5.) Given: $\angle CDE$ and $\angle FDE$ are linear pairs
Prove: $x = 40$



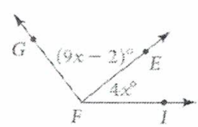
6.) Given: $\overrightarrow{BC}$ bisects $\angle ABD$
Prove: $m\angle ABD = 110$



7.) Given: $\angle WXY$ and $\angle ZXY$ are complementary
Prove: $x = 11$



8.) Given: $m\angle GFI = 128$
Prove: $m\angle GFE = 88$



Math 2

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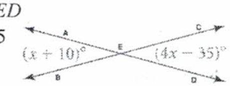
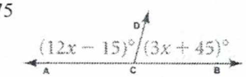
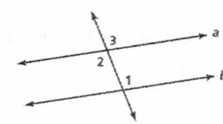
9.) Given: $\angle AEB \cong \angle CED$
Prove: $m\angle AEC = 155$



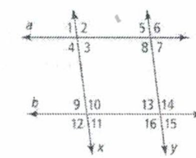
10.) Given: $\angle ACD$ and $\angle BCD$ are supplementary
Prove: $m\angle BCD = 75$



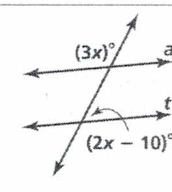
11.) Given: a || b
Prove: $\angle 1 \cong \angle 3$



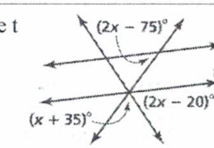
12.) Given: $a \parallel b$
Prove: $\angle 4$ and $\angle 15$ are supplementary



13.) Given: Line a || Line t
Prove: $x = 38$



14.) Given: Line a || Line t
Prove: $x = 48$



Math 2

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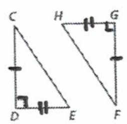
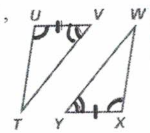
Complete each proof using a flow proof.

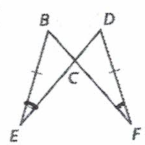
15.) Given: $\overline{CD} \cong \overline{FG}$, $\overline{DE} \cong \overline{GH}$, and $\angle D \cong \angle G$
Prove: $\Delta CDE \cong \Delta FGH$



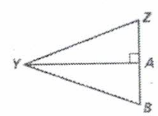
16.) Given: $\angle U \cong \angle X$, $\angle V \cong \angle Y$, and $\overline{UV} \cong \overline{XY}$
Prove: $\Delta TUV \cong \Delta WXY$



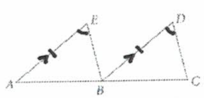
17.) Given: $\angle E \cong \angle F$, $\overline{BE} \cong \overline{DF}$
Prove: $\Delta BEC \cong \Delta DFC$



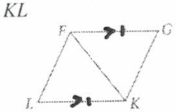
18.) Given: $\overline{YA}$ bisects $\overline{ZB}$ and $\overline{YZ} \cong \overline{YB}$
Prove: $\Delta YZA \cong \Delta YBA$



19.) Given: $\overline{AE} \parallel \overline{BD}$, $\overline{AE} \cong \overline{BD}$, and $\angle E \cong \angle D$
Prove: $\Delta AEB \cong \Delta BDC$



20.) Given: $\overline{FG} \parallel \overline{KL}$, $\overline{FG} \cong \overline{KL}$
Prove: $\Delta FGK \cong \Delta KLF$



① Given: $3-2x=17$

Prove: $x=-7$

$$\begin{aligned}3-2x&=17\\ -3\quad&\quad -3\\ \frac{-2x}{-2}&=\frac{14}{-2}\\ x&=-7\end{aligned}$$

	Statements	Reasons
①	$3-2x=17$	Given
②	$-2x=14$	Subtraction Postulate
③	$x=-7$	Division Postulate

② Given: $\frac{1}{2}x-5=10$

Prove: $x=30$

$\frac{1}{2}x-5=10$

$(2)\frac{1}{2}x-5(2)=10(2)$

Statements	Reasons
1) $\frac{1}{2}x-5=10$	Given
2) $x-10=20$	Multiplication Postulate
3) $x=30$	Addition Postulate

Statements	Reasons
$\frac{1}{2}x-5=10$	Given
$\frac{1}{2}x=15$	Addition Postulate
$x=30$	Multiplication Postulate

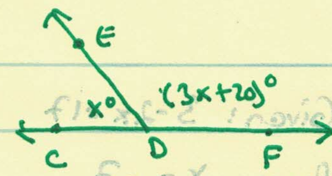
③ Given: $5(x+3)=-5$

Prove: $x=-4$

Statements	Reasons
1) $5(x+3)=-5$	Given
2) $5x+15=-5$	Distributive Prop.
3) $5x=-20$	Substraction Post
4) $x=-4$	Division Prop. of =

5) Given: $\angle CDE$ and $\angle FDE$ are linear pairs

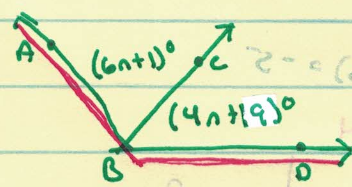
Prove: $x = 40$



Statements	Reasons
1) $\angle CDE$ and $\angle FDE$ are linear pairs	Given
2) $\angle CDE$ and $\angle FDE$ are supplementary	Def. of Linear Pairs
3) $m\angle CDE + m\angle FDE = 180$	Def. of Supplementary $\angle$s
4) $x + 3x + 20 = 180$	Substitution Postulate
5) $4x + 20 = 180$	Def. of Like Terms
6) $4x = 160$	Subtraction Property of =
7) $x = 40$	Division Prop. of =

6) Given: $\overrightarrow{BC}$ bisects $\angle ABD$

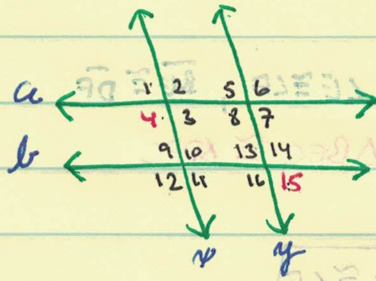
Prove: $m\angle ABD = 110°$



Statements	Reasons
1) $\overrightarrow{BC}$ bisects $\angle ABD$	Given
2) $m\angle ABC = m\angle CBD$	Defn. of Angle Bisector
3) $6n + 1 = 4n + 19$	Substitution Post.
4) $2n + 1 = 19$	Subtraction Prop. of =
5) $2n = 18$	Subtraction Prop. of =
6) $n = 9$	Division Prop of =
7) $m\angle ABC + m\angle CBD = m\angle ABD$	Given
8) $6n+1 + 4n+19 = m\angle ABD$	Substitution
9) $6(9)+1 + 4(9)+19 = m\angle ABD$	Substitution
10) $110° = m\angle ABD$	Def. of Simplify

(12) Given: $a \parallel b$

Prove: $\angle 4$ and $\angle 15$ are supplementary

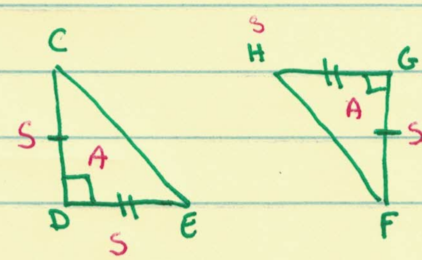


	Statement	Reasons
1)	$a \parallel b$	Given
2)	$\angle 4$ and $\angle 9$ are supplementary	Def. of Same-Side-Interior
3)	$m\angle 4 + m\angle 9 = 180^\circ$	Def. of Supplementary $\angle$s
4)	$\angle 8$ and $\angle 13$ are supplementary	Def. of Same-side-Interior
5)	$m\angle 8 + m\angle 13 = 180^\circ$	Def. of Supplementary $\angle$s
6)	$\angle 13 \cong \angle 15$	Vertical $\angle$s
7)	$m\angle 13 = m\angle 15$	Def. of $\cong$ $\angle$s
8)	$\angle 9 \cong \angle 13$	Corresponding $\angle$s
9)	$m\angle 9 = m\angle 13$	Def of $\cong$ $\angle$s
10)	$m\angle 4 + m\angle 15 = 180^\circ$	Substitution
11)	$\angle 4$ and $\angle 15$ are supplementary	Def of Supplementary $\angle$s

(15) Given: $\overline{CD} \cong \overline{FG}$, $\overline{DE} \cong \overline{GH}$

and $\angle D \cong \angle G$

Prove: $\triangle CDE \cong \triangle FGH$



$\boxed{\overline{CD} \cong \overline{FG}}$ Given

$\boxed{\overline{DE} \cong \overline{GH}}$ Given

$\boxed{\angle D \cong \angle G}$ Given

$\boxed{\triangle CDE \cong \triangle FGH}$

by SAS Postulate

(17) Given $\angle E \cong \angle F$, $\overline{BE} \cong \overline{DF}$

Prove: $\triangle BEC \cong \triangle DFC$

$\boxed{\angle E \cong \angle F}$

Given

$\boxed{\overline{BE} \cong \overline{DF}}$

Given

$\boxed{\angle BCE \cong \angle DCF}$

Vertical $\angle$

$\boxed{\triangle BEC \cong \triangle DFC}$

by AAS Postulate