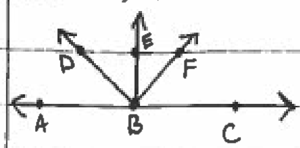
Key

1 p. 57 CE #4-11

A#17 2 p. 58-60 WE #1-8, 9-12 (Reasons), 13, 14-25 (Reasons), 28

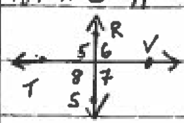
1 p. 57 CE #4-11

For #4, 5



Statement	Reason	Statement
4. $m\angle CBF = 40^\circ$	[Given]	5. $m\angle CBF = x^\circ$
$m\angle EBF = 50^\circ$	[Ext. Sides $\perp \rightarrow$ adj comp $\angle$s]	$m\angle EBF = (90-x)^\circ$
$m\angle DBE = 40^\circ$	["]	$m\angle DBE = x^\circ$
$m\angle DBA = 50^\circ$	["]	$m\angle DBA = (90-x)^\circ$
$m\angle DBC = 130^\circ$	[$\angle$ Add Post]	$m\angle DBC = (90+x)^\circ$

For #6-11



6. If $\angle 6$ is a right $\angle$, then $\overleftrightarrow{RS} \perp \overleftrightarrow{TV}$. [Def. of $\perp$]

7. If $\overleftrightarrow{RS} \perp \overleftrightarrow{TV}$, then $\angle 5, \angle 6, \angle 7$, and $\angle 8$ are right $\angle$s. [Def. of $\perp$]

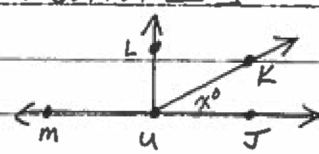
8. If $\overleftrightarrow{RS} \perp \overleftrightarrow{TV}$, then $\angle 8 \cong \angle 7$. [$\perp$ lines $\rightarrow \cong$ adj. $\angle$s]

9. If $\overleftrightarrow{RS} \perp \overleftrightarrow{TV}$, then $m\angle 6 = 90^\circ$. [Def. of $\perp$]

10. If $\angle 5 \cong \angle 6$, then $\overleftrightarrow{RS} \perp \overleftrightarrow{TV}$. [Lines form $\cong$ adj $\angle$s $\rightarrow \perp$ lines]

11. If $m\angle 5 = 90^\circ$, then $\overleftrightarrow{RS} \perp \overleftrightarrow{TV}$. [Def. of $\perp$]

2 p. 58-60 WE #1-25, 28



1. $\overrightarrow{UL} \perp \overleftrightarrow{MJ}$ and $m\angle JUK = x$. [Given]

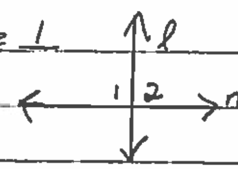
a. $m\angle LUK = (90-x)^\circ$ [Ext. sides $\perp \rightarrow$ adj. comp. $\angle$s]

b. $m\angle MUK = (180-x)^\circ$ [$\angle$ Add Post]

2. Thm: If 2 lines form $\cong$ adjacent $\angle$s, then the lines are $\perp$.

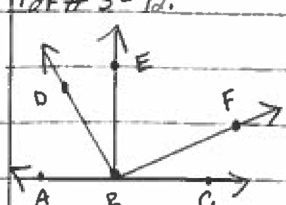
Given: $\angle 1 \cong \angle 2$

Prove: $l \perp n$



statements	Reasons
① $\angle 1 \cong \angle 2$ / $m\angle 1 = m\angle 2$	① Given / Def. of $\cong \angle$s
② $m\angle 1 + m\angle 2 = 180^\circ$	② $\angle$ Add. Post.
③ $m\angle 2 + m\angle 2 = 180^\circ$ / $2m\angle 2 = 180^\circ$	③ Subst. Prop. of $=$ (1→2) / Dist. Prop
④ $m\angle 2 = 90^\circ$	④ Div. Prop. of $=$
⑤ $l \perp n$	⑤ Def. of $\perp$

For #3-12.



3. If $\angle EDC$ is a right $\angle$, then $\overrightarrow{BE} \perp \overleftrightarrow{AC}$. [Def. of $\perp$]

4. If $\overleftrightarrow{AC} \perp \overrightarrow{BE}$, then $\angle ABE$ is a right $\angle$. ["]

5. If $\overrightarrow{BE} \perp \overleftrightarrow{AC}$, then $\angle ABD$ and $\angle DBE$ are complementary. [Ext. sides $\perp \rightarrow$ adj. comp. $\angle$s]

6. If $\angle ABD$ and $\angle DBE$ are complementary $\angle$s, then $m\angle ABD + m\angle DBE = 90^\circ$ [Def. of Comp. $\angle$s]

7. If $\overrightarrow{BE} \perp \overleftrightarrow{AC}$, then $m\angle ABE = 90^\circ$. [Def. of $\perp$]

8. If $\angle ABE \cong \angle EBC$, then $\overleftrightarrow{AC} \perp \overrightarrow{BE}$. [2 lines form $\cong$ adj. $\angle$s $\rightarrow \perp$ lines]

A#17 continued

Key

p. 58-60 WE #9-25, 28 [See previous page for the diagram for #9-12 and given $\overrightarrow{BE} \perp \overleftrightarrow{AC}$, $\overrightarrow{BD} \perp \overrightarrow{BF}$.

9. $m\angle ABD = 2x - 15$; $m\angle DBE = x$ [Given]

$\angle ABD$ and $\angle DBE$ are comp. $\angle$s [Ext. sides $\perp \rightarrow$ comp. adj. $\angle$s]

$m\angle ABD + m\angle DBE = 90°$ [Def. of comp. $\angle$s]

$2x - 15 + x = 90°$

$3x = 105$

$\boxed{x = 35}$

10. $m\angle DBE = 3x$; $m\angle EBF = 4x - 1$ [Given]

$m\angle DBE + m\angle EBF = 90°$ [Ext. side $\perp \rightarrow$ comp. adj. $\angle$s / Def. of comp. $\angle$s]

$3x + 4x - 1 = 90$

$7x = 91$

$\boxed{x = 13}$

11. $m\angle ABD = 3x - 12$; $m\angle DBE = 2x + 2$; $m\angle EBF = 2x + 8$ [Given]

$m\angle ABD + m\angle DBE = 90°$ [Ext. sides $\perp \rightarrow$ comp. adj. $\angle$s / Def. of comp. $\angle$s]

$3x - 12 + 2x + 2 = 90$

$5x = 100$

$\boxed{x = 20}$

12. $m\angle ABD = 6x$, $m\angle DBE = 3x + 9$, $m\angle EBF = 4x + 18$, $m\angle FBC = 4x$ [Given]

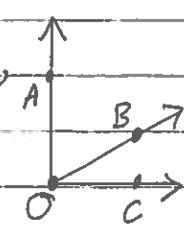
$m\angle ABD + m\angle DBE = 90°$ [Ext. sides $\perp \rightarrow$ comp. adj. $\angle$s / Def. of comp. $\angle$s]

$6x + 3x + 9 = 90$

$9x = 81$

$\boxed{x = 9}$

13. Thm: If the exterior sides of 2 adjacent acute $\angle$s are $\perp$, then the angles are complementary.



Given: $\overrightarrow{OA} \perp \overrightarrow{OC}$

Prove: $\angle AOB$ and $\angle BOC$ are complementary $\angle$s

Statements	Reasons
1 $\overrightarrow{OA} \perp \overrightarrow{OC}$	1 Given
2 $m\angle AOC = 90°$	2 Def. of $\perp$
3 $m\angle AOB + m\angle BOC = m\angle AOC$	3 $\angle$ Add. Post.
4 $m\angle AOB + m\angle BOC = 90°$	4 Subst. Prop. of = $(2 \rightarrow 3)$
5 $\angle AOB$ and $\angle BOC$ are comp. $\angle$s	5 Def. of comp. $\angle$s

A#17 continued

Key

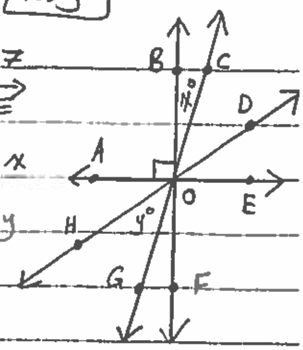
p. 59-60 WE #14-25,28

For #14-17

Given: $\overleftrightarrow{BF} \perp \overleftrightarrow{AE}$

$m\angle BOC = x$

$m\angle GOH = y$



14. $m\angle COA = m\angle AOB + m\angle BOC$ [∠ Add Post]

$m\angle COA = 90 + x$

$\boxed{m\angle COA = (x+90)^\circ}$

15. $m\angle COH + m\angle GOH = 180^\circ$ [∠ Add Post.]

$m\angle COH + y = 180$

$\boxed{m\angle COH = (180-y)^\circ}$

16. ① $m\angle GOF = x^\circ$ [Vert. ∠s Thm / Def. of ≅ ∠s]

② $m\angle HOF = m\angle GOF + m\angle GOH$ [∠ Add Post]

$\boxed{m\angle HOF = (x+y)^\circ}$

17. ① $\angle BOD \cong \angle HOF$ [Vert. ∠s Thm]

$m\angle BOD = (x+y)^\circ$ [Def. of ≅ ∠s]

② $\angle BOD$ is comp. to $\angle DOE$ [Ext sides ⊥ → Comp. adj. ∠s]

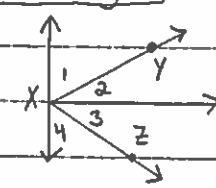
$m\angle DOE + m\angle BOD = 90^\circ$ [Def. of comp. ∠s]

$m\angle DOE + x + y = 90^\circ$

$\boxed{m\angle DOE = (90-x-y)^\circ}$

For #18-25, Can you conclude $\overrightarrow{XY} \perp \overrightarrow{XZ}$?

For #18-25:



18. ① $m\angle 1 = 46^\circ$ and $m\angle 4 = 44^\circ$ [Given]

② $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 = 180^\circ$ [∠ Add Post]

③ $m\angle 2 + m\angle 3 = 90^\circ$ [Subst. Prop of = (②-①)]

④ ∠2 + ∠3 are Comp ∠s [Def. of Comp. ∠s]

⑤ $\overrightarrow{XY} \perp \overrightarrow{XZ}$ [Comp. Adj ∠s → Ext. sides ⊥] ✓

19. ① ∠1 and ∠3 are complementary [Given]

② ∠2 and ∠4 are Complementary [∠ Add Post / Def. of Comp.]

No Adj Comp. ∠s → Cannot conclude ⊥ [CE: $m\angle 1 = 20^\circ$ $m\angle 3 = 70^\circ$ $m\angle 2 = 40^\circ$ $m\angle 4 = 50^\circ$]

20. ① $\angle 2 \cong \angle 3$ [Given]

No relationship can be proven → Cannot conclude ⊥ [CE: $m\angle 2 = m\angle 3 = 20^\circ$ $m\angle 1 = 80^\circ$ $m\angle 4 = 60^\circ$]

21. ① $m\angle 1 = m\angle 4$ [Given]

Similar to #20: No relationship can be proven → Cannot conclude ⊥ [CE: $m\angle 1 = m\angle 4 = 20^\circ$ $m\angle 2 = 80$ $m\angle 3 = 60^\circ$]

22. ① ∠1 and ∠3 are ≅ and complementary. [Given]

② $m\angle 1 = m\angle 3$ and $m\angle 1 + m\angle 3 = 90^\circ$ [Def. of ≅ and comp]

③ $m\angle 1 = m\angle 3 = 45^\circ$ [Subst. Prop of = (②→①) / Dist. Prop / Div. Prop of =] ✓

④ ∠2 and ∠4 are Complementary [∠ Add Post / Def of Comp]

No Adj Comp. ∠s → Cannot conclude ⊥ [CE: $m\angle 1 = m\angle 3 = 45^\circ$ $m\angle 2 = 50^\circ$ $m\angle 4 = 40^\circ$]

A#17 continued

Key

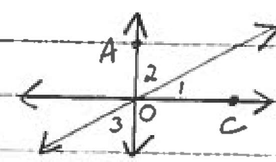
p. 59-60 WE #23-25, 28 [See previous page for the diagram for #23-25]

23. ① $m\angle 1 = m\angle 2$ and $m\angle 3 = m\angle 4$ [Given]
② $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 = 180°$ [$\angle$ Add Post]
③ $m\angle 2 + m\angle 2 + m\angle 3 + m\angle 3 = 180°$ [Subst. Prop. of = (① → ②)]
④ $2m\angle 2 + 2m\angle 3 = 180°$ [Dist. Prop.]
⑤ $m\angle 2 + m\angle 3 = 90°$ [Div. Prop. of =]
⑥ $\angle 2 + \angle 3$ are Comp [Def. of Comp.]
⑦ $\overrightarrow{XY} \perp \overrightarrow{XZ}$ [Comp. Adj. $\angle$s → Ext. sides $\perp$] ✓

24. ① $\angle 1 \cong \angle 3$ and $\angle 2 \cong \angle 4$ [Given]
② $m\angle 1 = m\angle 3$, $m\angle 2 = m\angle 4$ [Def. of $\cong$ $\angle$s]
③ $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 = 180°$ [$\angle$ Add Post]
④ $m\angle 3 + m\angle 2 + m\angle 3 + m\angle 2 = 180°$ [Subst. Prop. of = (② → ③)]
⑤ $2m\angle 2 + 2m\angle 3 = 180°$ [Dist. Prop.]
* $\overrightarrow{XY} \perp \overrightarrow{XZ}$ [See ⑤ through ⑦ in #23] ✓

25. ① $\angle 1 \cong \angle 4$ and $\angle 2 \cong \angle 3$ [Given]
No Adj. Comp. $\angle$s → Cannot conclude $\perp$ [CE: $m\angle 1 = m\angle 4 = 40°$, $m\angle 2 = m\angle 3 = 50°$]

28. Given: $\overleftrightarrow{AO} \perp \overleftrightarrow{CO}$



Prove: $\angle 1$ and $\angle 3$ are comp. $\angle$s

Statements	Reasons
① $\overleftrightarrow{AO} \perp \overleftrightarrow{CO}$	① Given
② $\angle 1$ and $\angle 2$ are Comp. $\angle$s	② Ext. sides $\perp$ → Adj. Comp. $\angle$s
③ $m\angle 1 + m\angle 2 = 90°$	③ Def. of comp. $\angle$s
④ $\angle 2 \cong \angle 3$	④ Vert. $\angle$s Thm.
⑤ $m\angle 2 = m\angle 3$	⑤ Def. of $\cong$ $\angle$s
⑥ $m\angle 1 + m\angle 3 = 90°$	⑥ Subst. Prop. of = (⑤ → ③)
⑦ $\angle 1$ and $\angle 3$ are comp. $\angle$s	⑦ Def. of Comp. $\angle$s