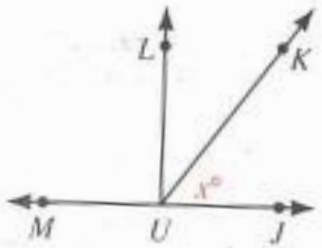
Homework #14
WE: Pages 58 - 60
#1 - 29 odd

Written Exercises

A **1.** In the diagram, $\overrightarrow{UL} \perp \overleftrightarrow{MJ}$ and $m\angle JUK = x$. Express in terms of x the measures of the angles named.



a. $\angle LUK$ — $90 - x$

b. $\angle MUK$ — $180 - x$

2. Copy and complete the proof of Theorem 2-5: If two lines form congruent adjacent angles, then the lines are perpendicular.

Given: $\angle 1 \cong \angle 2$
Prove: $l \perp n$

Proof:

Statements	Reasons
1. $\angle 1 \cong \angle 2$, or $m\angle 1 = m\angle 2$	1. ? — Given
2. $m\angle 1 + m\angle 2 = 180$	2. ? — Angle Addition Post.
3. $m\angle 2 + m\angle 2 = 180$, or $2m\angle 2 = 180$	3. ? — Substitution Prop.
4. $m\angle 2 = 90$	4. ? — Division Prop. of =
5. ? — $l \perp n$	5. Def. of $\perp$ lines

Name the definition or state the theorem that justifies the statement about the diagram.

5. If the ext. sides of 2 adj. $\triangle$ are $\perp$, then the $\triangle$ are comp.

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

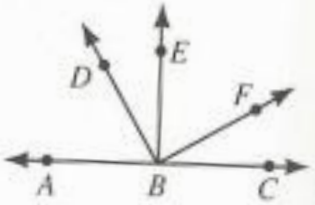
4. If $\overleftrightarrow{AC} \perp \overrightarrow{BE}$, then $\angle ABE$ is a right angle. Def. of $\perp$ lines

5. If $\overrightarrow{BE} \perp \overleftrightarrow{AC}$, then $\angle ABD$ and $\angle DBE$ are complementary.

6. If $\angle ABD$ and $\angle DBE$ are complementary angles, then $m\angle ABD + m\angle DBE = 90$. Def. of comp. $\triangle$

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

8. If $\angle ABE \cong \angle EBC$, then $\overleftrightarrow{AC} \perp \overrightarrow{BE}$.
If 2 lines form $\cong$ adj. $\triangle$, then the lines are $\perp$.



Exs. 3–12

In the diagram, $\overrightarrow{BE} \perp \overleftrightarrow{AC}$ and $\overrightarrow{BD} \perp \overrightarrow{BF}$. Find the value of x.

9. $m\angle ABD = 2x - 15$, $m\angle DBE = x$ — $x = 35$

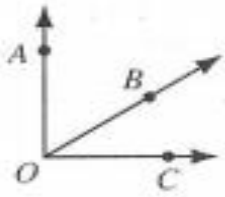
10. $m\angle DBE = 3x$, $m\angle EBF = 4x - 1$ — $x = 13$

11. $m\angle ABD = 3x - 12$, $m\angle DBE = 2x + 2$, $m\angle EBF = 2x + 8$ — $x = 20$

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

13. Copy and complete the proof of Theorem 2-6: If the exterior sides of two adjacent acute angles are perpendicular, then the angles are complementary.

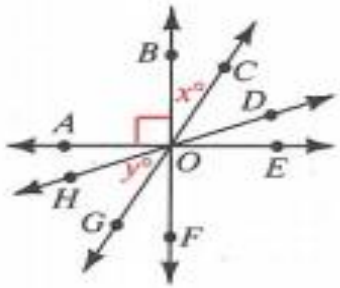
Given: $\overrightarrow{OA} \perp \overrightarrow{OC}$
Prove: $\angle AOB$ and $\angle BOC$ are comp. $\measuredangle$.



Proof:

Statements	Reasons
1. $\overrightarrow{OA} \perp \overrightarrow{OC}$	1. ? **Given**
2. $m\angle AOC = 90$	2. Def. of $\perp$ lines
3. $m\angle AOB + m\angle BOC = m\angle AOC$	3. ? **Angle Addition Post.**
4. ? **$m\angle AOB + m\angle BOC = 90$**	4. Substitution Prop.
5. ? **$\angle AOB$ and $\angle BOC$ are comp. $\measuredangle$.**	5. Def. of comp. $\measuredangle$

In the figure $\overleftrightarrow{BF} \perp \overleftrightarrow{AE}$, $m\angle BOC = x$, and $m\angle GOH = y$. Express the measure of the angle in terms of x, y, or both.



B

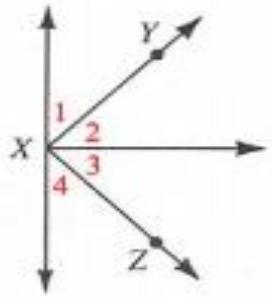
14. $\angle COA$ **$x + 90$**

15. $\angle COH$ **$180 - y$**

16. $\angle HOF$ **$x + y$**

17. $\angle DOE$ **$90 - (x + y)$**

Can you conclude from the information given for each exercise that $\overrightarrow{XY} \perp \overrightarrow{XZ}$?



18. $m\angle 1 = 46$ and $m\angle 4 = 44$ **Yes**

19. $\angle 1$ and $\angle 3$ are complementary. **No**

20. $\angle 2 \cong \angle 3$ **No**

21. $m\angle 1 = m\angle 4$ **No**

22. $\angle 1$ and $\angle 3$ are congruent and complementary. **No**

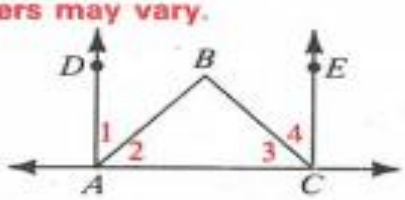
23. $m\angle 1 = m\angle 2$ and $m\angle 3 = m\angle 4$ **Yes**

24. $\angle 1 \cong \angle 3$ and $\angle 2 \cong \angle 4$ **Yes**

25. $\angle 1 \cong \angle 4$ and $\angle 2 \cong \angle 3$ **No**

What can you conclude from the information given? **Answers may vary.**

26. Given: $\overrightarrow{AB}$ bisects $\angle DAC$; **$m\angle 1 = 45$; $m\angle 4 = 45$;**
$\overrightarrow{CB}$ bisects $\angle ECA$; **$\angle DAC$ is a rt. $\angle$;**
$m\angle 2 = 45$; **$\angle ECA$ is a rt. $\angle$;**
$m\angle 3 = 45$ **$\overleftrightarrow{AD} \perp \overleftrightarrow{AC}$; $\overleftrightarrow{CE} \perp \overleftrightarrow{AC}$**



27. Given: $\overrightarrow{AD} \perp \overleftrightarrow{AC}$; $\overrightarrow{CE} \perp \overleftrightarrow{AC}$; $m\angle 1 = m\angle 4$
$m\angle 2 = m\angle 3$; $m\angle DAC = 90$; $m\angle ECA = 90$

C **29.** First find two lines (other than $\overleftrightarrow{YD}$ and $\overleftrightarrow{YF}$) that are perpendicular. Then write a two-column proof that the lines are perpendicular.

Given: $\overleftrightarrow{YD} \perp \overleftrightarrow{YF}$;
$m\angle 7 = m\angle 5$;
$m\angle 8 = m\angle 6$

Prove: ? $\perp$? **$\overleftrightarrow{XD}$, $\overleftrightarrow{XF}$**