Homework #6

WE: Page 21

#2 - 18 evens

WE: Pages 25 - 26

#1 - 3 odd, 5 - 20 all

Written Exercises

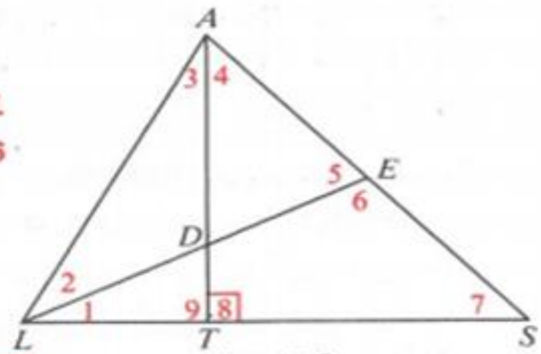
A

1. Name the vertex and the sides of $\angle 5$. **E; $\overrightarrow{EL}$, $\overrightarrow{EA}$**
2. Name all angles adjacent to $\angle ADE$. **$\angle ADL$, $\angle EDT$**

Answers may vary in Exs. 3–8.

State another name for the angle.

3. $\angle 1$ **$\angle DLT$**
4. $\angle 3$ **$\angle LAT$**
5. $\angle 5$ **$\angle AEL$**
6. $\angle ALD$ **$\angle 2$**
7. $\angle AST$ **$\angle 7$**
8. $\angle LES$ **$\angle 6$**



Exs. 1–18

State whether the angle appears to be acute, right, obtuse, or straight.

9. $\angle 2$ **acute**
10. $\angle LAS$ **acute**
11. $\angle ATL$ **right**
12. $\angle S$ **acute**
13. $\angle LTS$ **straight**
14. $\angle EDT$ **obtuse**

Complete.

15. $m\angle 3 + m\angle 4 = m\angle$ _?_ **LAS**
16. $m\angle ALS - m\angle 2 = m\angle$ _?_ **1**
17. If $m\angle 1 = m\angle 2$, then _?_ bisects _?_. **$\overrightarrow{LE}$**, **$\angle ALS$**
18. $m\angle LDA + m\angle ADE =$ _?_ **180**

Written Exercises

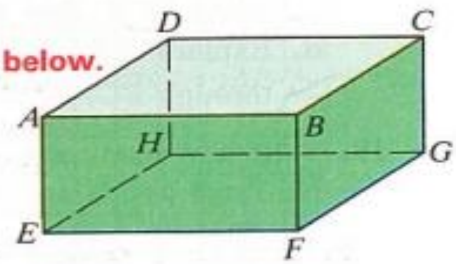
A 1. State Theorem 1-2 using the phrase *one and only one*. **If there is a line and a point not on the line, then one and only one plane contains them.**

2. Reword Theorem 1-3 as two statements, one describing existence and the other describing uniqueness. **See below.**

3. Planes M and N are known to intersect.
   a. What kind of figure is the intersection of M and N? **a line**
   b. State the postulate that supports your answer to part (a). **If two planes intersect, then their intersection is a line.**

4. Points A and B are known to lie in a plane.
   a. What can you say about $\overleftrightarrow{AB}$? **$\overleftrightarrow{AB}$ is in the plane.**
   b. State the postulate that supports your answer to part (a). **If 2 pts. are in a plane, then the line that contains the pts. is in that plane.**

In Exercises 5-11 you will have to visualize certain lines and planes not shown in the diagram of the box. When you name a plane, name it by using four points, no three of which are collinear.



Exs. 5-12

5. Write the postulate that assures you that $\overleftrightarrow{AC}$ exists. **See below.**

6. Name a plane that contains $\overleftrightarrow{AC}$. ***ABCD***

7. Name a plane that contains $\overleftrightarrow{AC}$ but that is not shown in the diagram. **ACGE**

8. Name the intersection of plane $DCFE$ and plane $ABCD$. **$\overleftrightarrow{CD}$**

9. Name four lines shown in the diagram that don't intersect plane $EFGH$. **$\overleftrightarrow{AB}$, $\overleftrightarrow{CD}$, $\overleftrightarrow{AD}$, $\overleftrightarrow{BC}$**

10. Name two lines that are not shown in the diagram and that don't intersect plane $EFGH$. **$\overleftrightarrow{AC}$, $\overleftrightarrow{BD}$**

11. Name three planes that don't intersect $\overleftrightarrow{EF}$ and don't contain $\overleftrightarrow{EF}$. ***ABCD, DCGH, ABGH***

12. If you measure $\angle EFG$ with a protractor you get more than 90°. But you know that $\angle EFG$ represents a right angle in a box. Using this as an example, complete the table.

	$\angle EFG$	$\angle AEF$	$\angle DCB$	$\angle FBC$
In the diagram	obtuse	? **rt.**	? **ac.**	? **obt.**
In the box	right	? **rt.**	? **rt.**	? **rt.**

State whether it is possible for the figure described to exist. Write *yes* or *no*.

B 13. Two points both lie in each of two lines. **No**

14. Three points all lie in each of two planes. **Yes**

15. Three noncollinear points all lie in each of two planes. **No**

16. Two points lie in a plane X, two other points lie in a different plane Y, and the four points are coplanar but not collinear. **Yes**

2. If two lines intersect, then at least one plane contains the lines.
If two lines intersect, then no more than one plane contains the lines.

5. Through any 2 pts. there is exactly 1 line.

17. Points R, S, and T are noncollinear points.

a. State the postulate that guarantees the existence of a plane X that contains R, S, and T. **Through any 3 pts. there is at least 1 plane.**

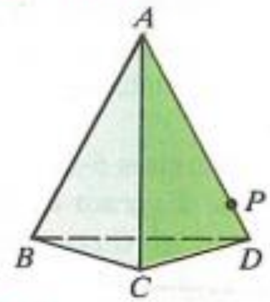
b. Draw a diagram showing plane X containing the noncollinear points R, S, and T. **Check students' drawings.**

c. Suppose that P is any point of $\overleftrightarrow{RS}$ other than R and S. Does point P lie in plane X? Explain. **Yes. If 2 pts. are in a plane, then the line that contains the pts. is in that plane.**

d. State the postulate that guarantees that $\overleftrightarrow{TP}$ exists. **Through any 2 pts. there is exactly 1 line.**

e. State the postulate that guarantees that $\overleftrightarrow{TP}$ is in Plane X. **See 17. c.**

18. Points A, B, C, and D are four noncoplanar points.



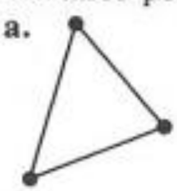
a. State the postulate that guarantees the existence of planes ABC, ABD, ACD, and BCD. **See 17. a.**

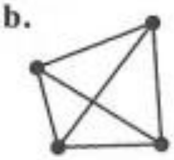
b. Explain how the Ruler Postulate guarantees the existence of a point P between A and D.

c. State the postulate that guarantees the existence of plane BCP. **See 17. a.**

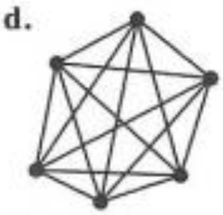
d. Explain why there are an infinite number of planes through $\overline{BC}$. **There are an infinite number of pts. P on $\overleftrightarrow{AD}$. For each P there exists a plane BCP.**

C **19.** State how many segments can be drawn between the points in each figure. No three points are collinear.

a. 
3 points
3 _?_ segments

b. 
4 points
6 _?_ segments

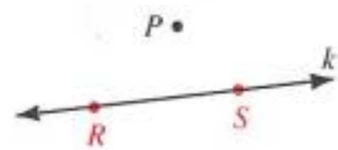
c. 
5 points
10 _?_ segments

d. 
6 points
15 _?_ segments

e. Without making a drawing, predict how many segments can be drawn between seven points, no three of which are collinear. **21**

f. How many segments can be drawn between n points, no three of which are collinear? $\frac{n(n-1)}{2}$

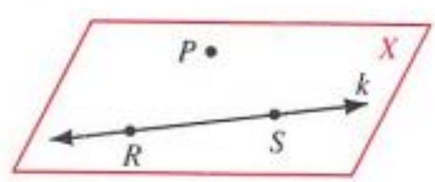
20. Parts (a) through (d) justify Theorem 1-2: Through a line and a point not in the line there is exactly one plane.



a. If P is a point not in line k, what postulate permits us to state that there are two points R and S in line k? **Post. 5**

b. Then there is at least one plane X that contains points P, R, and S. Why? **See below.**

c. What postulate guarantees that plane X contains line k? Now we know that there is a plane X that contains both point P and line k. **Post. 8**



d. There can't be another plane that contains point P and line k, because then *two* planes would contain noncollinear points P, R, and S. What postulate does this contradict? **See below.**

20. b. Through any 3 pts. there is at least 1 plane.
20. d. Through any 3 noncoll. pts. there is exactly 1 plane.