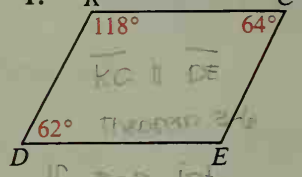
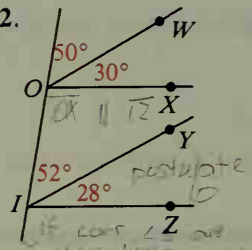
Classroom Exercises

State which segments (if any) are parallel. State the postulate or theorem that justifies your answer.

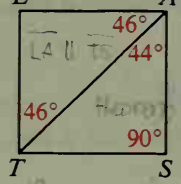
1.



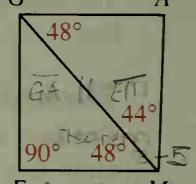
2.



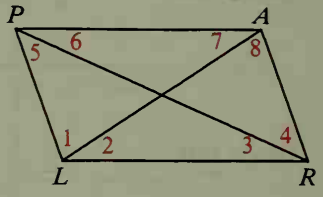
3.



4.



In each exercise some information is given. Use this information to name the segments that must be parallel. If there are no such segments, say so.



5. $m\angle 1 = m\angle 8$

6. $\angle 2 \cong \angle 7$

7. $\angle 5 \cong \angle 3$

8. $m\angle 5 = m\angle 4$

9. $m\angle 5 + m\angle 6 = m\angle 3 + m\angle 4$

10. $m\angle APL + m\angle PAR = 180$

11. $m\angle 1 + m\angle 2 + m\angle 5 + m\angle 6 = 180$

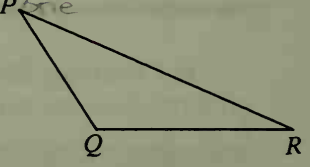
12. Reword Theorem 3-8 as two statements, one describing existence and the other describing uniqueness.

13. Reword Theorem 3-9 as two statements, one describing existence and the other describing uniqueness.

14. How many lines can be drawn through P parallel to $\overleftrightarrow{QR}$?

15. How many lines can be drawn through Q parallel to $\overleftrightarrow{PR}$?

16. How many lines can be drawn through P perpendicular to $\overleftrightarrow{QR}$?



17. In the plane of P, Q, and R, how many lines can be drawn through R perpendicular to $\overleftrightarrow{QR}$? What postulate or theorem justifies your answer?

18. In space, how many lines can be drawn through R perpendicular to $\overleftrightarrow{QR}$?

19. True or false?

a. Two lines perpendicular to a third line must be parallel.

b. In a plane two lines perpendicular to a third line must be parallel.

c. In a plane two lines parallel to a third line must be parallel.

d. Any two lines parallel to a third line must be parallel.

20. Use the diagram to explain why Theorem 3-10 is true for coplanar lines. That is, if $k \parallel l$ and $k \parallel n$, why does it follow that $l \parallel n$?