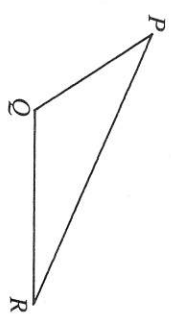


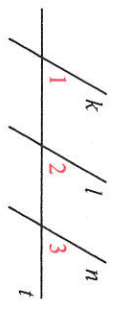
14. In the plane containing P , Q , and R , how many lines can be drawn through R perpendicular to \overrightarrow{PQ} ? What postulate or theorem enables you to answer the question?



15. If you are not confined to the plane containing P , Q , and R , how many lines can be drawn through R perpendicular to \overrightarrow{PQ} ?

16. 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.

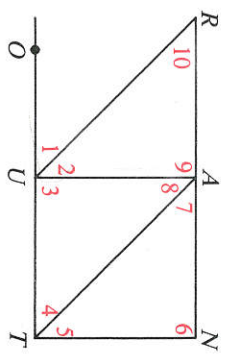
17. In a plane, $k \parallel l$ and $k \parallel n$. Use the diagram to explain why $l \parallel n$.



Written Exercises

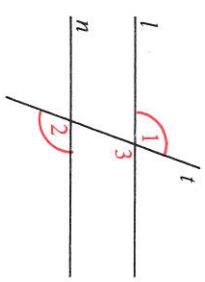
Use the given information to name the segments that must be parallel. If there are no such segments, write none.

- A**
- $\angle 1 \cong \angle 4$
 - $m\angle 2 = m\angle 10$
 - $m\angle 5 = m\angle 7$
 - $\angle 5 \cong \angle 8$
 - $m\angle 6 = m\angle 9 = 90$
 - $m\angle 6 = m\angle 3 = 90$
 - $m\angle 7 = m\angle 10 = m\angle 1$
 - $\overline{AU} \perp \overline{OT}$, $\overline{NT} \perp \overline{OT}$
 - $\angle 2 \cong \angle 5$
 - $m\angle 2 = m\angle 5 = m\angle 8$



11. Write the reasons.

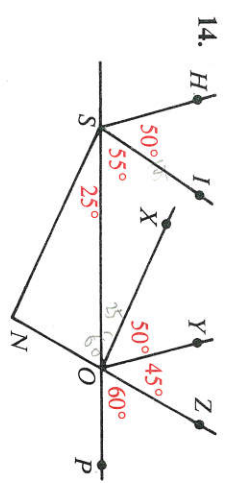
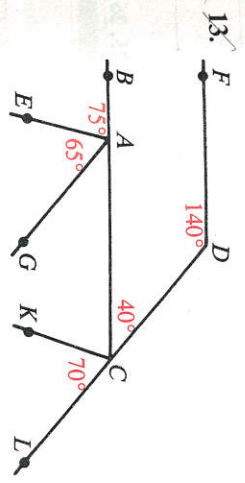
Given: Transversal t cuts lines l and n ;
 $\angle 1 \cong \angle 2$



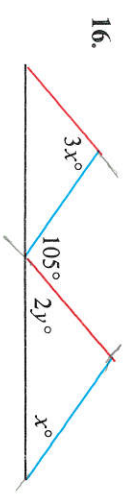
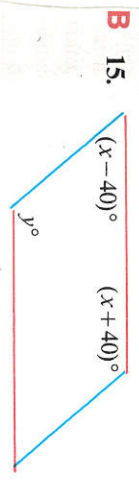
Statements	Reasons
1. Transversal t cuts l and n .	1. ?
2. $\angle 1 \cong \angle 3$	2. ?
3. $\angle 2 \cong \angle 1$	3. ?
4. $\angle 2 \cong \angle 3$	4. ?
5. $l \parallel n$	5. ?

12. Restate Theorem 2-9 as two statements, one describing existence and the other describing uniqueness.

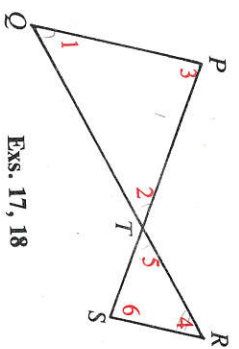
Name two pairs of parallel lines in each figure. Which congruent or supplementary angles did you use to determine the parallel lines?



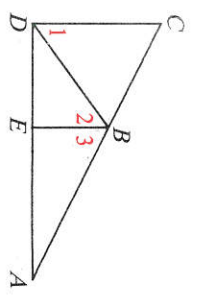
Find the values of x and y that make the red lines parallel and the blue lines parallel.



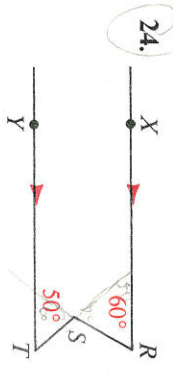
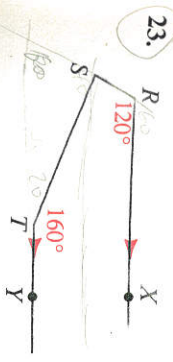
17. Given: $\angle 1 \cong \angle 2$; $\angle 4 \cong \angle 5$
 What can you prove about \overline{PQ} and \overline{RS} ? Be prepared to give your reasons in class, if asked.
18. Given: $\angle 3 \cong \angle 6$
 What can you prove about other angles? Be prepared to give your reasons in class, if asked.



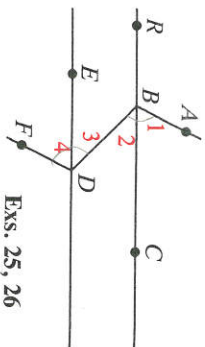
19. Copy what is shown for Theorem 2-6 on page 65. Then write a proof in two-column form.
20. Copy what is shown for Theorem 2-7 on page 65. Then write a proof in two-column form.
21. Given: $\overline{BE} \perp \overline{DA}$; $\overline{CD} \perp \overline{DA}$
 Prove: $\angle 1 \cong \angle 2$
22. Given: $\angle C \cong \angle 3$; $\overline{BE} \perp \overline{DA}$
 Prove: $\overline{CD} \perp \overline{DA}$



Find the measure of $\angle RST$. (Hint: Draw a line through S parallel to \overline{RX} and \overline{TY} .)

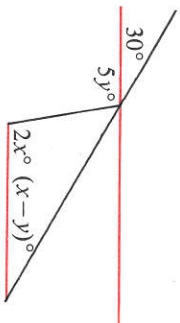


25. Given: $m\angle 1 = m\angle 4$; $\overline{BC} \parallel \overline{ED}$
Prove: $\overline{AB} \parallel \overline{DF}$



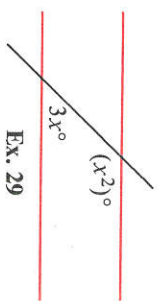
Exs. 25, 26

26. Given: $m\angle ABD = m\angle FDB$; $m\angle 1 = m\angle 4$
Prove: $\overline{BC} \parallel \overline{ED}$



Ex. 27

27. Find the values of x and y that make the lines shown in red parallel.



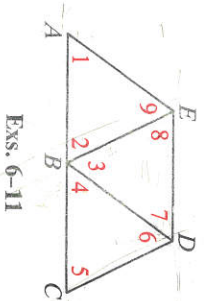
Ex. 29

457 MW

Self-Test 1

Complete each statement with the word *always*, *sometimes*, or *never*.

- Two lines that do not intersect are parallel.
- Two skew lines intersect.
- If two parallel lines are cut by a transversal, then the same-side interior angles are supplementary.
- Two lines perpendicular to a third line are parallel.
- If a line is parallel to plane X and also to plane Y , then plane X and plane Y are parallel.
- Complete: If $\overline{AE} \parallel \overline{BD}$, then $\angle 1 \cong$ and $\angle 9 \cong$.
- If $\overline{ED} \parallel \overline{AC}$, name all pairs of angles that must be congruent.
- If $\overline{ED} \parallel \overline{AC}$ and $\overline{EB} \parallel \overline{DC}$, name all angles that must be congruent to $\angle 5$.

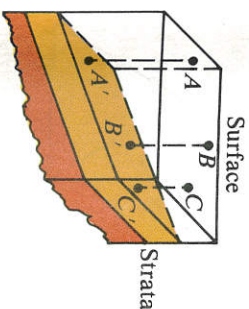


Exs. 6–11

9. $\angle 3 \cong \angle 6$ 10. $\angle 9 \cong \angle 6$ 11. $m\angle 7 + m\angle AED = 180$

Geologist

Geologists study rock formations such as those at Checkerboard Mountain in Zion National Park. Rock formations often occur in *strata*, or layers, beneath the surface of the Earth. Earthquakes occur at *faults*, breaks in the strata. In search of a fault, how would you determine the position of a stratum of rock buried deep beneath the surface of the Earth?



A geologist might start by picking three noncollinear points, A , B , and C , on the surface and drilling holes to find the depths of points A' , B' , and C' on the stratum. These three points determine the plane of the surface of the stratum.



Today, geologists are trying to locate sources of geothermal energy, generated by the Earth's internal heat. A career in geology usually requires knowledge of mathematics, physics, and chemistry, as well as a degree in geology.