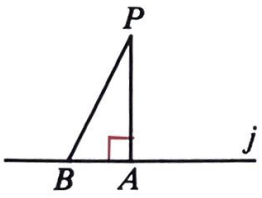
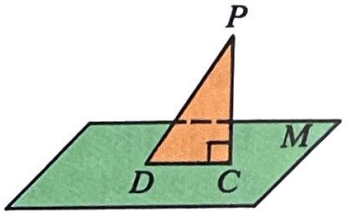
17. Suppose you know only that the length of one side of a rectangle is 100. What can you say about the length of a diagonal?

18. Use the diagram below to explain how Corollary 1 follows from Theorem 6-3.



Ex. 18



Ex. 19

19. Use the diagram, in which $\overline{PC} \perp$ plane M, to explain how Corollary 2 follows from Theorem 6-3 or from Corollary 1.

20. Which is the largest angle of a right triangle? Which is the longest side of a right triangle? Explain.

Written Exercises

The lengths of two sides of a triangle are given. Write the numbers that best complete the statement: The length of the third side must be greater than ?, but less than ?.

A

1. 6, 9

2. 15, 13

3. 100, 100

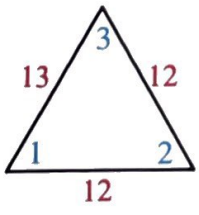
4. $7n$, $10n$

5. a, b (where $a > b$)

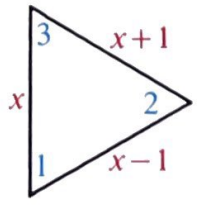
6. k, $k + 5$

In Exercises 7–9 the diagrams are not drawn to scale. If each diagram were drawn to scale, which numbered angle would be the largest?

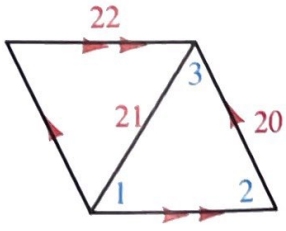
7.



8.

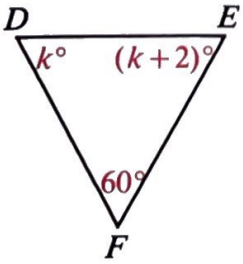


9.

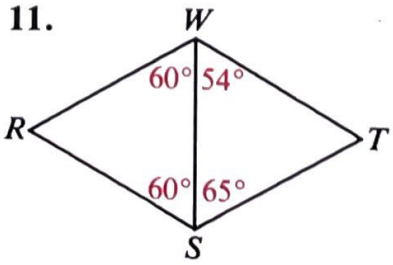


In Exercises 10–14 the diagrams are not drawn to scale. If each diagram were drawn to scale, which segment shown would be the longest?

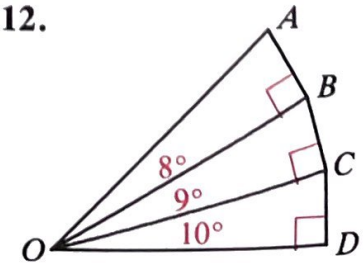
10.



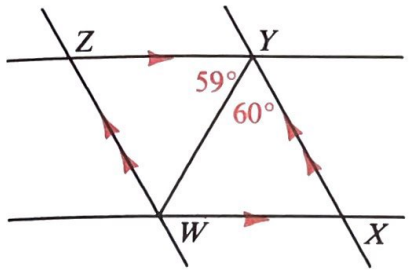
11.



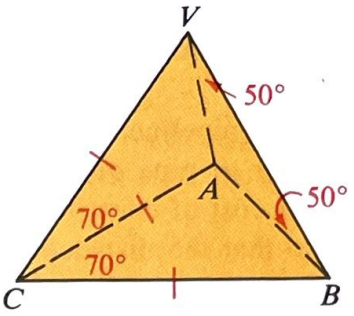
12.



B **13.**

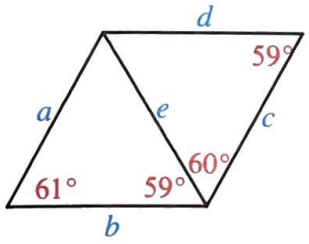


14.



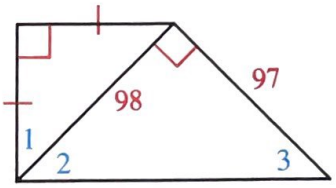
15. Use the lengths a, b, c, d, and e to complete:

$\underline{?} > \underline{?} > \underline{?} > \underline{?} > \underline{?}$



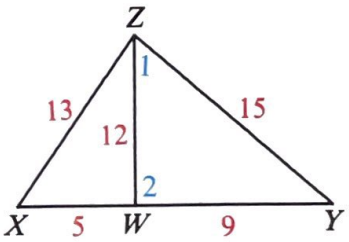
16. Use $m\angle 1$, $m\angle 2$, and $m\angle 3$ to complete:

$\underline{?} > \underline{?} > \underline{?}$

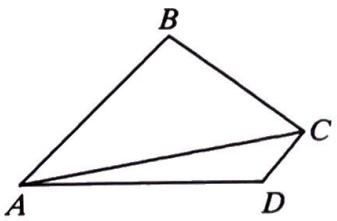


17. The diagram is not drawn to scale. Use $m\angle 1$, $m\angle 2$, $m\angle X$, $m\angle Y$, and $m\angle XZY$ to complete:

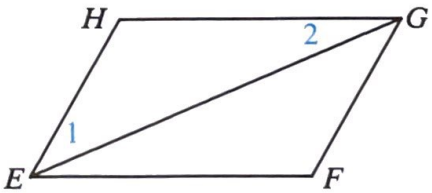
$\underline{?} > \underline{?} > \underline{?} > \underline{?} > \underline{?}$



18. Given: Quad. $ABCD$
Prove: $AB + BC + CD + DA > 2(AC)$



19. Given: $\square EFGH$; $EF > FG$
Prove: $m\angle 1 > m\angle 2$



C **20.** Discover, state, and prove a theorem that compares the perimeter of a quadrilateral with the sum of the lengths of the diagonals.

21. Prove that the sum of the lengths of the medians of a triangle is greater than half the perimeter.

22. If you replace "medians" with "altitudes" in Exercise 21, can you prove the resulting statement? Explain.

In Exercises 23 and 24, begin your proofs by drawing auxiliary lines.

23. Discover, state, and prove a theorem that compares the length of the longest side of a quadrilateral with the sum of the lengths of the other three sides.

24. Prove: If P is any point inside $\triangle XYZ$, then $ZX + ZY > PX + PY$.