20. a. Complete this statement of Theorem 8-4:

If the square of the longest side of a triangle \_?...

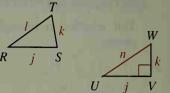
b. Prove Theorem 8-4.

Given:  $\triangle RST$ ;  $\overline{RT}$  is the longest side;  $l^2 < j^2 + k^2$ 

Prove:  $\triangle RST$  is an acute triangle.

(*Hint*: Start by drawing right  $\triangle UVW$  with legs j and k.

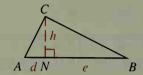
Compare lengths l and n.)



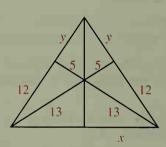
C 21. Given:  $\overline{CN} \perp \overline{AB}$ ;

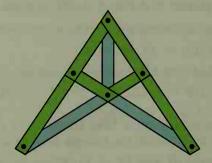
h is the geometric mean between d and e.

Prove:  $\triangle ABC$  is a right triangle.



22. A frame in the shape of the simple scissors truss shown at the right below can be used to support a peaked roof. The weight of the roof compresses some parts of the frame (green), while other parts are in tension (blue). A frame made with s segments joined at j points is stable if  $s \ge 2j - 3$ . In the truss shown, 9 segments connect 6 points. Verify that the truss is stable. Then find the values of x and y.





## **Explorations**

These exploratory exercises can be done using a computer with a program that draws and measures geometric figures.

The sides of a quadrilateral have lengths a, b, c, and d. The diagonals have lengths e and f. For what kinds of quadrilaterals does

$$a^2 + b^2 + c^2 + d^2 = e^2 + f^2$$
?

Draw various quadrilaterals including a parallelogram, rectangle, rhombus, trapezoid, and a random quadrilateral.