Building Trusses

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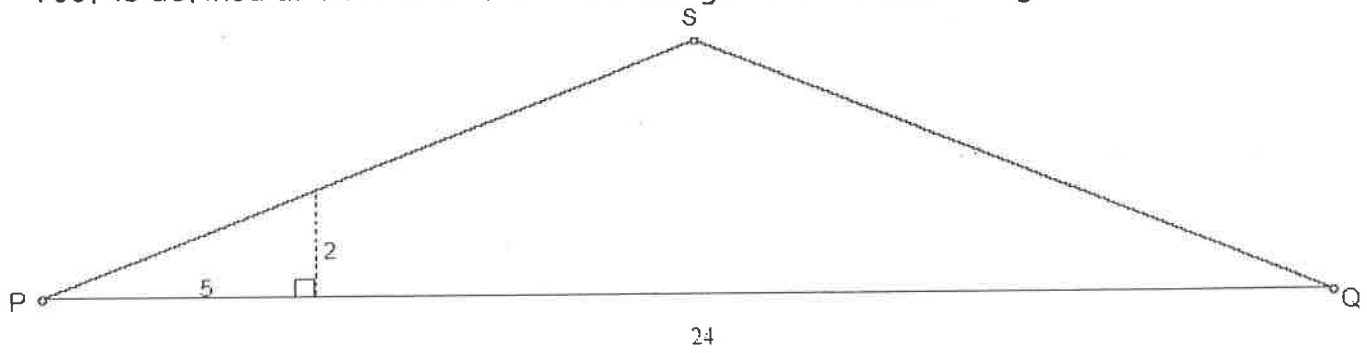
Triangles are the simplest polygons and are the most useful polygons. This activity will examine how triangles are used in building roof trusses.

1. Below is a diagram of a roof with a $\frac{2}{5}$ pitch spanning 24 feet. (PS=QS) The pitch of a roof is defined as the ratio of vertical change to horizontal change.



a. Calculate the measure of $\angle SPQ$.

b. Draw the altitude from point S to $\overline{PQ}$ and label the intersection R. Find SR.

c. Find PS. Express your answer in terms of feet and inches.

d. Make a scale drawing of the roof on grid paper.

e. Subdivide $\overline{PR}$ into four equal segments. Label each subdivision point from left to right A, B, and C. At each subdivision point draw a perpendicular to $\overline{PR}$. Label the intersection of each perpendicular with $\overline{PS}$ from left to right L, M and N. Find LA, MB and NC.

f. Draw segments LB, MC, and NR. Find these lengths.

g. To complete the truss, reflect the figure across $\overline{SR}$.

2. Suppose a roof has a pitch of $\frac{3}{5}$ and spans 24 ft. (AB=BC) BD is an altitude of ΔABD. DF and DE are support beams constructed perpendicular to AB and BC. Find the lengths of each support beam (DF, BD, and DE).