

**Problem 1 Answer**

Rise = 9, run = 12, rafter =  $\sqrt{9^2 + 12^2} = \sqrt{\text{rafter}^2}$  Rafter = 15 Ratio 15/12 = 1.25

Hip length =  $\sqrt{\text{HipRunSquared} + \text{RiseSquared}} = \sqrt{12^2 + 12^2 + 9^2} = 19.2094$

Ratio of Hip Length to Common Run =  $19.2094/12 = 1.6008$ .

**Problem 2 Answer**

The side cut as listed on the rafter framing square is confusingly drawn on the unbacked top surface of the hip timber.

The number you will find in the correct row under the 9 column on your square body is 10-5/8. The numbers you will use to layout this cut in a regular roof only (90 degree corner and equal pitches) are 10-5/8 and 12.

The right triangle that describes this cut is formed by the length of the hip rafter and the length of the tangent (when considering plan view: The tangent length can be described as a line drawn square to the hip run will intersect an extension of the common run. If you calculate the length of this line, you will find that in a regular roof, the tangent is equal to the run of the hip.

We know the length of the hip is 19.2094 and the run is 16.9706. Since the length of the hip is greater than the run of the hip, you will place 12 toward the peak and 10-5/8 toward the foot. Draw a right triangle with the two square legs at the above mentioned dimensions. If you put your framing square on the triangle with the 12 at the apex, you will read 10-5/8 on the tongue.

**Problem 3 Answer**

8½ in 17 pitch = 6 in 12 pitch.

Rafter length for 12 foot run = 13 feet, 5 inches.

Slope (in degrees) = 26.5651 (Tangent of 26.5651 degrees = 0.5 = 6/12)

**Problem 4 Answer**

23 feet, 9 5/8 inches