Carpentry & Building Construction

Chapter 18 Hip, Valley, & Jack Rafters

Section 18.1 Assessment Answers
1. A hip rafter forms a raised area while a valley rafter forms a depression in the roof instead of a hip.
2. Backing the hip means to bevel the upper edge of the hip rafter.
3. If the hip rafter is framed against the ridge board, using a single side cut, the shortening allowance is one-half the 45° thickness of the ridge board.
4. The amount of rafter overhang has a significant impact on the appearance of a house. Deep overhangs protect walls from rain or shade them from intense sun. Shallow overhangs help to prevent ice dams caused when melted snow refreezes at the overhang.
5. The unit run of a hip rafter is the hypotenuse of a right triangle with the shorter sides each equal to the unit run of a common rafter. The unit run of a common rafter is 12". Using the Pythagorean theorem, $A^2 + B^2 = C^2$, the unit run of a hip rafter is the square root of 144 + 144 which is 16.97", which rounds to 17.

Section 18.2 Assessment Answers
1. In equal-span framing, the span, or width, of the addition is the same as the span of the main roof. When the pitch of the addition's roof is the same as the pitch of the main roof, the ridges of both roofs are at the same height.
2. When the pitch of the addition roof is the same as the pitch of the main roof, the addition ridge board will be at a lower level than the main roof ridge board.
3. When constructing a gable dormer without side walls, the dormer ridge board is fastened to a header.
4. The total run of the valley rafter is the hypotenuse of a right triangle.
5. Answers will vary.

Section 18.3 Assessment Answers
1. A jack rafter is a shortened common rafter that may be framed to a hip rafter, a valley rafter, or both.
2. A valley jack rafter extends from a valley rafter to a ridge board.
3. The best way to figure the total lengths of valley jacks and cripple jacks is to lay out a roof framing plan.
4. Rather than lay out and mark each jack rafter individually, a patter is used to save time.
5. $\text{unit length} = \sqrt{6^2 + 12^2} = \sqrt{36 + 144} = \sqrt{180} = 13.42;$

$$\frac{12"}{13.42"} = \frac{16"}{x}; 12x = 214.72; x = 17.89"$$