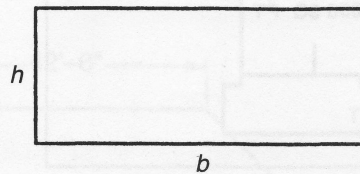


Unit 22 SURFACE MEASUREMENT— TRIANGLES

BASIC PRINCIPLES OF SURFACE MEASUREMENT

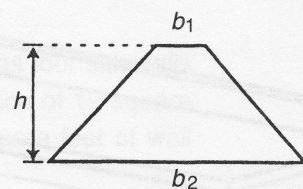
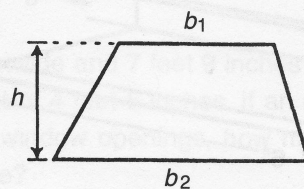
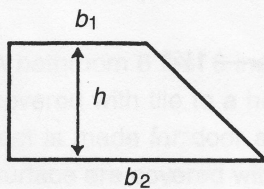
The procedure for finding the area of a rectangle is to multiply the length by the width, $l \times w = A$. The length could be considered as the base and the width considered as the altitude or height, $b \times h = A$.

Example:

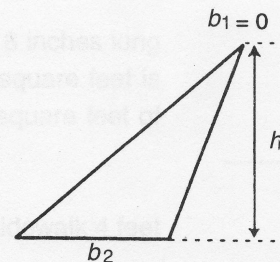
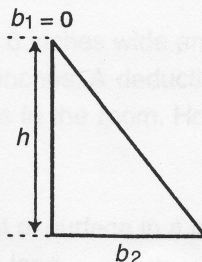
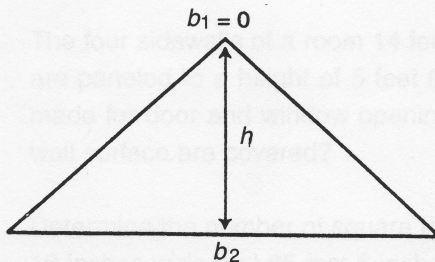


The procedure to find the area of a quadrilateral with only one pair of parallel sides is very similar. Since the parallel sides are not necessarily equal, use their average for the base, $\frac{1}{2}(b_1 + b_2) \times h = A$.

Example:



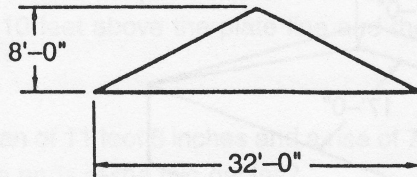
The procedure for finding the area of a triangle is very similar. Think of triangles as having four sides, the fourth being the vertex, which has zero length, $\frac{1}{2}(b + 0) \times h = A$ or $\frac{1}{2}b \times h = A$.



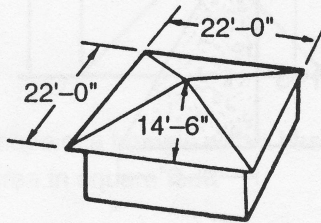
PRACTICAL PROBLEMS

1. Find the area of a triangle with the following dimensions: $h = 16"$, $b = 22"$ _____

2. How many square feet of gable are there in the triangular figure? _____

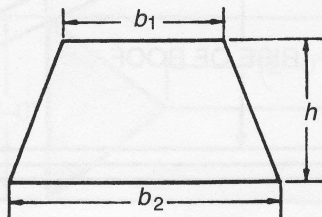


3. A gable has a span of 50 feet and a rise of 10 feet. What is the area in square feet? _____
4. A gable end has a 7-foot 6-inch rise and a span of 30 feet 6 inches. What is its area? _____
5. What is the area of the hip roof shown if the length of one side is 22 feet and the common rafter length is 14 feet 6 inches? _____

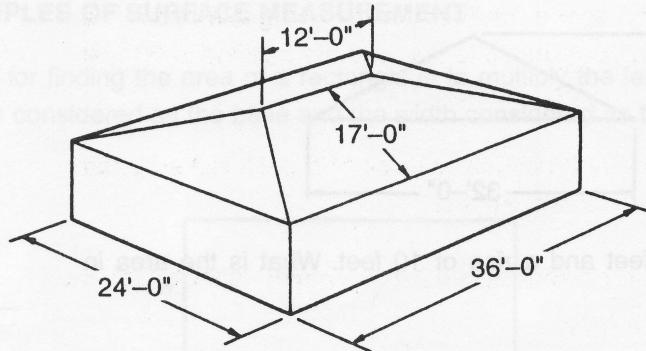


Note: A trapezoid is a quadrilateral with only one pair of parallel sides.

$$\text{Area of Trapezoid} = \frac{\text{base}_1 + \text{base}_2}{2} \times \text{height} \text{ or } A = \frac{1}{2}(b_1 + b_2) \times h$$

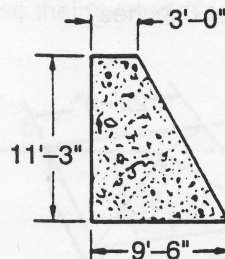


6. The building illustrated is 24 feet wide and 36 feet long. The common rafters are 17 feet long with no tails. The length of the ridge is 12 feet. Find the area of the hip roof. (Hint: Consider the roof as two triangles and two trapezoids, each with altitudes equal to the length of the common rafters.)

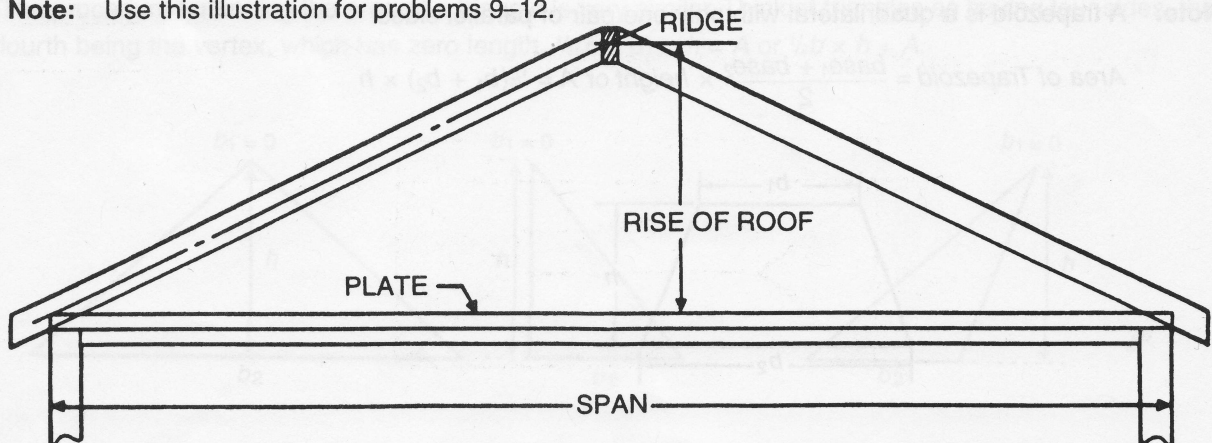


7. A gable roof has a span of 28 feet 6 inches. The height of the ridge above the plate is 14 feet 3 inches. How many square feet of surface are there in one of the gable ends?

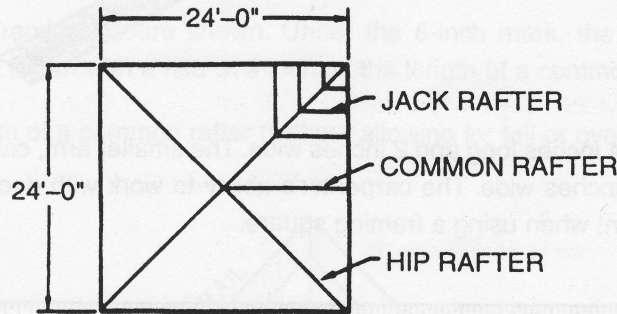
8. Find the number of square feet of form work required for the end of the concrete retaining wall illustrated.



Note: Use this illustration for problems 9–12.



9. What is the area of a gable that has a rise of 6 feet and a span of 18 feet? _____
10. A building is 30 feet wide and the ridge is 10 feet above the plate line. What is the area of the gable? _____
11. How many square feet of wall space are there in the two gable ends of a house if the ridge is 10 feet above the plate line and the building is 36 feet wide? _____
12. A gable roof has a span of 11 feet 6 inches and a rise of 7 feet 6 inches. What is the total area of the ends of the two gables? _____
13. What is the area of the square hip roof shown if the common rafter length is 16 feet 4 inches? _____



14. A building lot is in the shape of a triangle with a base of 80 feet and an altitude of 50 feet. What is its area in square feet? _____
15. a. Find the area of the shaded portions of the hip roof shown if the length of the common rafter is 12 feet 6 inches. a. _____
b. What is the area of the entire roof surface shown? b. _____

