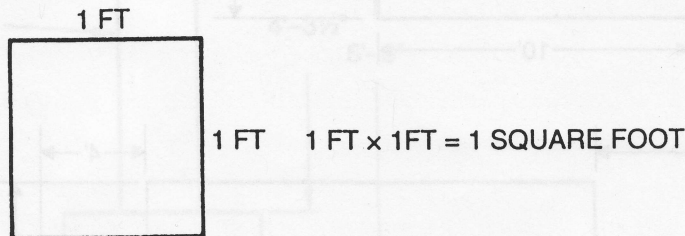


Unit 21 SQUARE MEASURE

BASIC PRINCIPLES OF SQUARE MEASURE

Area is always measured in units of *square feet*, *square inches*, *square yards*, and so forth. One inch times one inch equals one *square inch*, one foot times one foot equals one *square foot*, and so on.



To find the area of a rectangle, the width is multiplied by the length. (All dimensions must be in the same units. Inches must not be multiplied by feet or yards by inches, and so forth.)

Example: Find the area of a rectangle 18 inches wide and 3 feet long.

First change 18 inches to $1\frac{1}{2}$ feet, then multiply $1\frac{1}{2}$ feet by 3 feet. The answer will be $4\frac{1}{2}$ *square feet*.

Common area formulas:

Square: $\text{Area} = \text{side} \times \text{side} = s \times s = s^2$

Rectangle: $\text{Area} = \text{length} \times \text{width} = l \times w$

Triangle: $\text{Area} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} b \times h$

Circle: $\text{Area} = \pi \times \text{radius} \times \text{radius}$ or πr^2

In the English system, area is measured in *square inches*, *square feet*, *square yards*, and *square miles*. In the metric system, the basic unit of square measure is the *square meter*.

ENGLISH UNITS OF SQUARE MEASURE

144 square inches = 1 square foot

9 square feet = 1 square yard

4,840 square yards = 1 acre

SQUARE MEASURE UNIT	SYMBOL	RELATION TO SQUARE METER
1 square meter	m^2	standard unit of area
1 square decimeter	dm^2	0.01 square meter
1 square centimeter	cm^2	0.0001 square meter
1 square millimeter	mm^2	0.000001 square meter

METRIC UNITS OF SQUARE MEASURE

$100 \text{ dm}^2 = 1 \text{ m}^2$

$100 \text{ cm}^2 = 1 \text{ dm}^2$

$100 \text{ mm}^2 = 1 \text{ cm}^2$

$1,000,000 \text{ mm}^2 = 1 \text{ m}^2$

PRACTICAL PROBLEMS

Note: In problems 1–8, express answers in square feet (sq ft) or centimeters squared (cm^2), as appropriate.

Find the area following squares:

1. Side = $11' 0''$ _____

3. Side = $5'-3''$ _____

2. Side = 29 cm _____

4. Side = $6'-9''$ _____

Find the area of the following rectangles:

5. Width = 5', Length = 7' _____

6. Width = 9 m, Length = 17 m _____

7. Width = $4'-10''$, Length = $8'-2''$ _____

8. Width = $15'-0''$, Length = $36'-6''$ _____

Find the total wall area for the following rectangular rooms: w = room width, l = room length, h = wall height. (No allowance need be made for wall openings such as door, windows, and so forth.)

9. $w = 8'$, $l = 9'$, $h = 7'$ _____

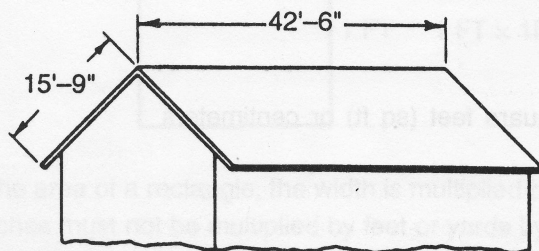
10. $w = 18'$, $l = 24'$, $h = 8'$ _____

11. $w = 18'-6"$ $l = 25'-6"$ $h = 9'-3"$ _____

12. $w = 14'$ $l = 22'-6"$ $h = 8'-6"$ _____

13. An apartment building contains 14 units, each 18 feet 6 inches by 26 feet 6 inches. What is the total floor area? _____

14. How many square feet of floor area are there in three two-story apartment houses, each of which is 38 feet wide and 76 feet long? _____

Note: Use this diagram for problem 15.

15. Both sides of the roof shown are covered with asphalt shingles. Find the number of square feet of surface covered. _____

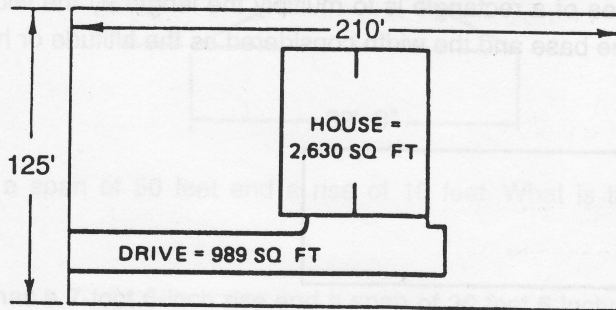
16. A bathroom 6 feet 6 inches wide and 7 feet 9 inches long has four sidewalls covered with tile to a height of 4 feet 6 inches. If an allowance of 19 square feet is made for door and window openings, how many square feet of wall surface are covered with tile? _____

17. A bathroom 6 feet 6 inches by 7 feet 8 inches has a tile floor. Determine the number of square feet covered. (Make no allowance for tub, toilet, and so forth.) _____

18. The four sidewalls of a room 14 feet 6 inches wide and 17 feet 8 inches long are paneled to a height of 5 feet 6 inches. A deduction of 27 square feet is made for door and window openings in the room. How many square feet of wall surface are covered? _____

19. Determine the number of square feet of surface in a concrete sidewalk 4 feet 10 inches wide and 65 feet 6 inches long. _____

20. How many square feet of cedar are required to line the sidewalls and ceiling of a closet 6 feet wide, $4\frac{1}{2}$ feet deep, and 8 feet high? (Allow 20 square feet for the door.)
21. A lawn is planned on the site illustrated. Deduct the area of the house and drive to find the area in square yards that is to be seeded.



22. At a rate of \$2.65 per square foot, what is the cost of the laminated plastic needed to cover the exposed surface of the illustrated countertop and backsplash? (Ends are not to be covered.)

