

Cubic feet: the formula, the conversion chart, and worked examples

The formula

cubic feet = length (ft) × width (ft) × height (ft)

Measured in inches: multiply the three, then divide by 1,728 (because $12 \times 12 \times 12 = 1,728$ cubic inches in a cubic foot). Cylinder: $\pi \times \text{radius}^2 \times \text{height}$, all in feet. A cubic foot is a cube one foot on each side: about the size of a basketball's box, or two bags of flour.

Conversion chart

1 cubic foot equals	
Cubic inches	1,728
Cubic yards	0.037 (27 cubic feet in a cubic yard)
Cubic metres	0.0283 (35.31 cubic feet in a cubic metre)
Litres	28.32
US gallons	7.48
Weight of water	62.4 lb (28.3 kg)

To convert	Multiply by
cubic inches to cubic feet	divide by 1,728
cubic feet to cubic yards	divide by 27
cubic feet to cubic metres	0.0283
cubic metres to cubic feet	35.31
cubic feet to litres	28.32
cubic feet to US gallons	7.48
cubic centimetres to cubic feet	divide by 28,317

What 1, 2, 5 and 10 cubic feet look like

Cubic feet	About the size of
1	A small moving box (16 × 12 × 9 in); a milk crate; the inside of a countertop microwave's smaller models
1.5 to 2	A medium moving box; a bag of mulch or potting soil (2 cu ft); a large countertop microwave interior (about 17 × 19 × 11 in); a mini fridge
3 to 5	A large moving box (3 cu ft); a front-load washing machine drum (4 to 5 cu ft); a dorm fridge
10	A chest freezer; the trunk of a small car
18 to 25	A full-size refrigerator (total interior)

Worked examples

Problem	Working	Answer
A box 24 in × 18 in × 12 in	$24 \times 18 \times 12 = 5,184$ cubic inches; $\div 1,728$	3 cubic feet
A room 12 ft × 10 ft × 8 ft high	$12 \times 10 \times 8$	960 cubic feet
A fridge interior 30 in × 28 in × 60 in	$30 \times 28 \times 60 = 50,400$; $\div 1,728$	29.2 cubic feet
Mulch for a bed 10 ft × 4 ft, 3 in deep	3 in = 0.25 ft; $10 \times 4 \times 0.25 = 10$ cu ft; $\div 2$ per bag	10 cubic feet = 5 bags
A concrete slab 10 ft × 10 ft × 4 in	4 in = $\frac{1}{3}$ ft; $10 \times 10 \times \frac{1}{3} = 33.3$ cu ft; $\div 27$	33.3 cubic feet = 1.23 cubic yards
A cylindrical tank, radius 1 ft, height 3 ft	$3.1416 \times 1^2 \times 3$	9.42 cubic feet (70 gallons)
A 2-cubic-foot microwave in inches	$2 \times 1,728$	3,456 cubic inches (about 17 × 19 × 11 in)

Practice (answers below)

1. A box is 3 ft by 2 ft by 2 ft. Cubic feet?
2. A box is 36 in by 24 in by 24 in. Cubic feet?
3. A sandbox 6 ft × 4 ft is filled 6 in deep. Cubic feet of sand?
4. How many 2-cubic-foot bags fill 15 cubic feet?
5. A pool 20 ft × 10 ft × 4 ft deep: cubic feet, and gallons?
6. Convert 2 cubic metres to cubic feet.
7. A moving truck holds 400 cubic feet. How many 3-cubic-foot boxes?
8. A cube has a volume of 27 cubic feet. How long is each side?

Answers

1) 12 2) $36 \times 24 \times 24 = 20,736 \div 1,728 = 12$ 3) $6 \times 4 \times 0.5 = 12$ 4) 7.5, so 8 bags 5) 800 cubic feet; $\times 7.48 = 5,984$ gallons 6) 70.6 7) 133 8) 3 ft

Measure something at home

Object: _____

Length × width × height (in or ft): _____

Cubic inches (if in inches): _____

Cubic feet: _____

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