

Useful Conversions, Area Determination, and Topdressing Calculations for Landscapes

Length

1 inch (in) = 2.54 centimeters (cm) or 25.4 millimeters (mm)
1 cm = 0.3937 in
1 foot (ft) = 12 in = 304.8 mm = 30.48 cm = 0.3048 meters (m)
1 yard (yd) = 3 ft = 36 in = 0.914 m

Area

1 square foot (ft²) = 144 square inches (in²)
1 square yard (yd²) = 9 ft²
1 square meter (m²) = 10.76 ft²
1 acre (ac) = 43,560 ft² = 4,480 yd² = 4,046.9 m² = 0.40469 hectares (ha)
1 hectare (ha) = 10,000 m² = 2.471 ac

Weight

1 ounce (oz) = 28.35 grams (g)
1 pound (lb) = 16 oz = 453.6 g = 0.4536 kilograms (kg)
1 kg = 2.205 lbs
1 gallon (gal) of water = 8.3356 lbs
1 cubic ft (ft³) of water = 62.36 lbs

Liquid

1 tablespoon (tbsp) = 3 teaspoons (tsp) = 15 milliliters (ml) = 0.5 fluid ounces (fl oz)
1 fl oz = 29.6 ml = 2 tbsp = 1.805 cubic inches (in³)
1 cup = 8 fl oz = 16 tbsp
1 pint (pt) = 2 cups = 16 fl oz = 473 ml
1 quart (qt) = 2 pt = 4 cups = 32 fl oz
1 gallon (gal) = 4 qt = 16 cups = 8 pt = 128 fl oz = 3.785 liters (l)
1000 ml = 1 liter

Volume

1 cubic centimeter (cc, cm³) = 0.061023 in³
1 cubic in (in³) = 16.387 cm³
1 cubic yard (yd³) = 27 ft³ = 46,656 in³ = 764,559.4 cm³

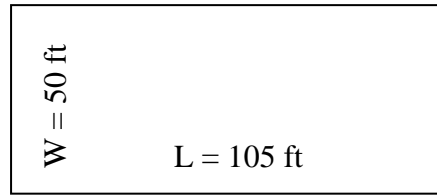
DETERMINING AREA

Square or Rectangle

$$\text{Area} = LW$$

L = Length

W = Width



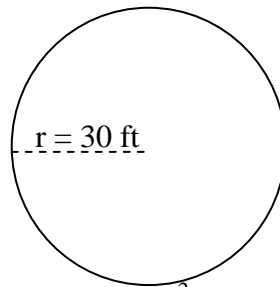
$$\text{Area} = 50 \text{ ft} \times 105 \text{ ft} = 5250 \text{ ft}^2$$

Circle or near Circular

$$\text{Area} = \pi r^2$$

$\pi = 3.14$

r = radius



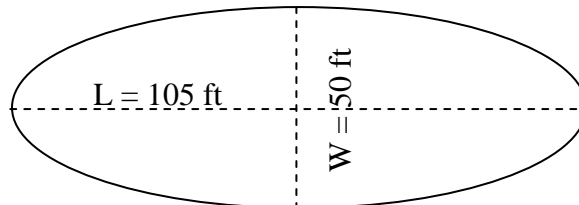
$$\text{Area} = 3.14 \times 30 \text{ ft} \times 30 \text{ ft} = 2,826 \text{ ft}^2$$

Ovals or Egg Shapes (within 5% accuracy)

$$\text{Area} = 0.8LW$$

L = Length

W = Width at Mid-Point



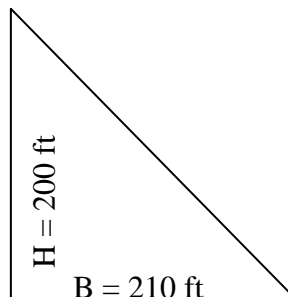
$$\text{Area} = 0.8 \times 105 \text{ ft} \times 50 \text{ ft} = 4,200 \text{ ft}^2$$

Triangle

$$\text{Area} = 0.5BH$$

B = Base

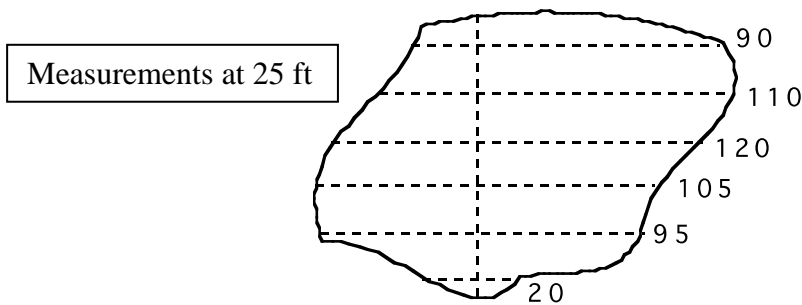
H = Height



$$\text{Area} = 0.5 \times 210 \text{ ft} \times 200 \text{ ft} = 21,000 \text{ ft}^2$$

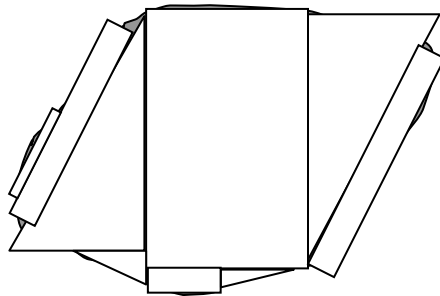
Irregular Shapes (within 5% accuracy)

- Determine longest axis of area
- Measure length of opposite axis at right angles to the first axis at a constant interval (e.g., 10 ft; 25ft; the smaller the interval, the more accuracy, but longer time needed)
- Sum all lengths and multiply by the interval constant



$$\begin{aligned} \text{Area} &= (90 \text{ ft} + 110 \text{ ft} + 120 \text{ ft} + 105 \text{ ft} + 95 \text{ ft} + 20 \text{ ft}) \times 25 \text{ ft} = \\ &= (540 \text{ ft}) \times 25 \text{ ft} = 13,500 \text{ ft}^2 \end{aligned}$$

Or, could segment the area into known shapes, measure each area, then sum the individuals areas for the total area:



Google Earth-based Area Determination (no endorsement intended or implied)

Google Earth offers tools that you can use to measure distance and estimate area. Tools depend on version of Google Earth:

- Measuring with a line or path (all Google Earth versions)
- Measuring with a circle radius or polygon (Google Earth PRO)

Third-Party Programs that work with Google Earth:

<http://www.daftlogic.com/projects-google-maps-area-calculator-tool.htm>

<http://www.freemaptools.com/area-calculator.htm>

There are most likely others that are available. You should validate the output with ground measurement comparison with whichever program you use.

DETERMINING VOLUME (for Topdressing)

Volume = LWD

L = Length

W = Width

D = Depth (or Height)

Example 1:

How many cubic yards (yd³) of yard-waste compost topdressing needed to provide a ¼-inch (0.25-inch) layer on a lawn that measures 200-ft long by 55-ft wide (11,00ft² or 1,221 yd²)?

Need the same units for all measurements (convert all to yd)

0.25 inch = 0.00694 yd (obtained from 0.25 ÷ 36)

200 ft = 66.7 yd (obtained from 200 ÷ 3)

55 ft = 18.3 yd (obtained from 55 ÷ 3)

Volume = LWD = 66.7 yd × 18.3 yd × 0.00694 yd = ≈8.5 yd³

Or could multiply the known area (in yd²) by the depth (in yd):

1,221 yd² × 0.00694 yd = ≈8.5 yd³

If topdressing is sold by the ton (2,000 lbs.), and assuming the bulk density of yard-waste compost is about 800 lbs. per yd³, then:

8.5 yd³ × 800 lbs. per yd³ = 6,800 lbs.

6,800 lbs. ÷ 2,000 lbs. per ton = ≈3.5 tons of yard-waste compost

(NOTE: compost bulk density can vary greatly depending on moisture content; get an estimate of the bulk density of the material you are using before you apply)

Example 2:

How much sand topdressing needed (yd³) to provide a ⅛-inch (0.125-inch) layer on a sports field that measures 125 yd long by 60 yd wide?

Need the same units for all measurements

0.125 inch = 0.0035 yd (obtained as 0.125 ÷ 36)

Volume = LWD = 125 yd × 60 yd × 0.0035 yd = 26.25 yd³

Or could multiply a known area by the depth needed:

7,500 yd² × 0.0035 yd = 26.25 yd³

Usually sand topdressing is sold by the ton (2,000 lbs). If the bulk density of dry sand is about 100 lbs per ft³, then:

26.25 yd³ × 27 ft³ per yd³ = 708.75 ft³

708.75 ft³ × 100 lbs. per ft³ = 70,875 lbs

70,875 lbs ÷ 2,000 lbs per ton = ≈35.5 tons of sand