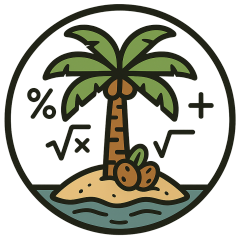


Dessert Isle Unit Analysis

Stranded Standards for Coconauts

Mr. Merrick

On the fabled *Dessert Isle*, shipwrecked scientist pirates standardized measurement using whatever they had: coconuts, bananas, ropes, hammocks, and drumbeats. These **Dessert Units** are *made up but internally consistent*. Your job is to apply unit analysis to convert between Dessert Units and familiar SI/US units, and to chain conversions through density, energy, power, and time. Keep the **Master Table** and the **Data Box** open while you work.

Master Table

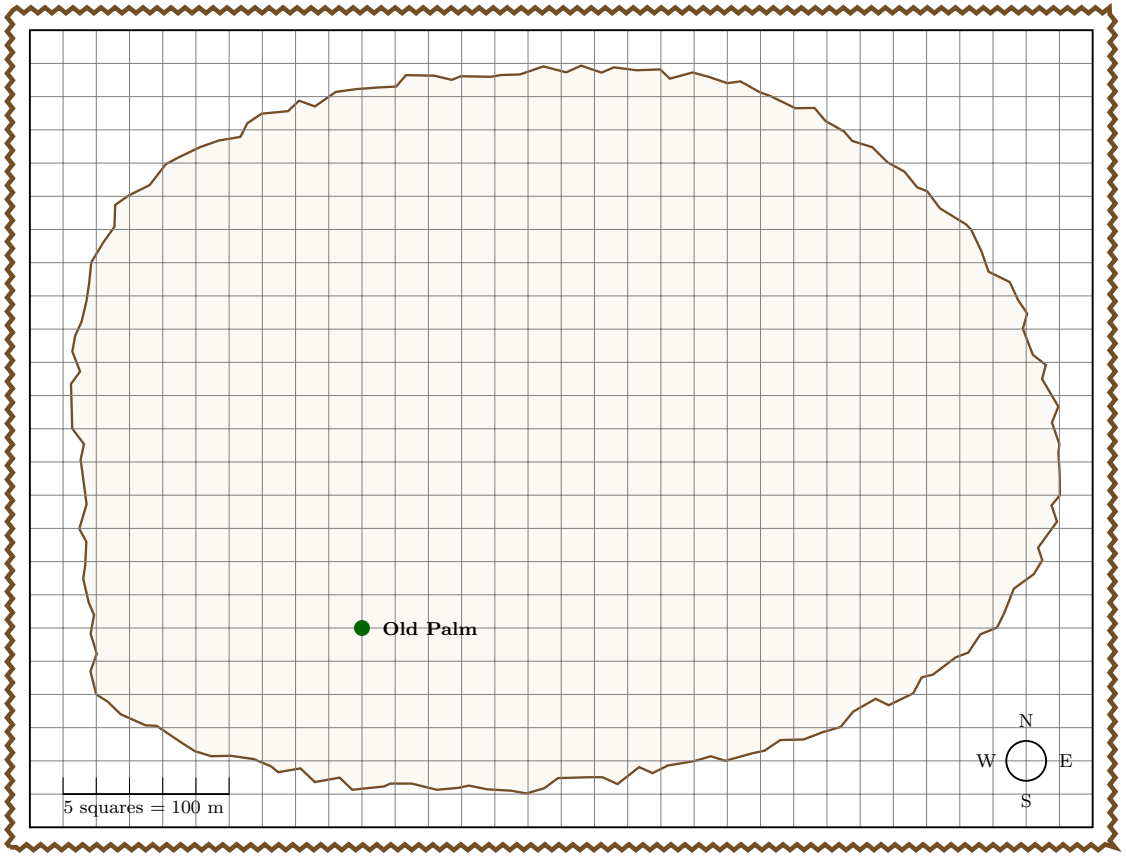
Quantity	Dessert Unit (symbol)	Equivalence (exact unless noted)
Length		
Banana (ba)	1 ba	= 0.20 m
Palm (pl)	1 pl	= 0.50 m
Coconut rope (crp)	1 crp	= 2.00 m
Island mile (imi)	1 imi	= 800 m
Area		
Hammock (hmk)	1 hmk	= 2.0 m^2
Sandpatch (spd)	1 spd	= 1.5 m^2
Leaf-mat (lmt)	1 lmt	= 0.50 m^2
Volume		
Coconut shell (csh)	1 csh	= 0.60 L
Gourd (grd)	1 grd	= 2.4 L = 4 csh
Island barrel (ibr)	1 ibr	= 25 L ≈ 6.58 US gal
Mass		
Coconut (cn)	1 cn	= 1.40 kg
Mango (mgo)	1 mgo	= 0.35 kg = 350 g
Crab (crb)	1 crb	= 0.12 kg
Stone (stn)	1 stn	= 2.50 kg
Time		
Drumbeat (db)	1 db	= 0.75 s
Sunset (sst)	1 sst	= 12 min = 720 s
Nap (np)	1 np	= 20 min
Tide (td)	1 td	= 5 h = 300 min
Derived / Reference		
Scurry (scy)	1 scy	= (1 pl)/(1 db) = $\frac{0.50\text{ m}}{0.75\text{ s}} = 0.667$ m/s
Firechip (fch)	1 fch	= 1.00 MJ = 10^6 J
Torch (trc)	1 trc	= 50 W = 50 J/s
Coco-milk density	ρ_{cmlk}	= 1050 kg/m^3 (use when cited)
Dry wood energy (ref)	e_{wood}	≈ 16 MJ/kg (use when cited)

Dessert Isle Data Box: Quick Equivalences

1 L = 1000 mL = 1000 cm^3; 1 m^3 = 1000 L
1 in = 2.54 cm; 1 ft = 0.3048 m; 1 mi = 1609 m
1 US gal = 3.785 L; 1 lb = 0.4536 kg
1 kWh = 3.6×10^6 J; 1 BTU ≈ 1055.06 J

This page intentionally left blank.

Captain Pi-rate Gaussbeard has left movement instructions. Convert each instruction to *squares*. Mark the treasure with an ×.



1. From the **Old Palm**, walk **260 pl** straight **north**.
2. Then go **300 ba east**.
3. Next, head **40 crp** toward the **northeast** at 45°.
4. Travel **0.08 imi south**.
5. Go **100 ba west**.
6. Move **east** at **25 crp/min** for **60 s**.
7. Go **north** for **0.08 sst** at **1.4 scy**.
8. Head **30 crp** toward the **southwest** at 45°.
9. For **180 db** at **1.3 scy**, move **east**.
10. Finally, advance **22 crp** toward the **northeast** at 45°.

This page intentionally left blank.

Practice — Dessert Isle Conversions

Use only the Master Table and the Data Box. Show unit cancellation at every step.

1. **Banana highway.** The beach loop is 1.75 imi. Express its length in palms (pl) and in bananas (ba).

2. **Hammock zoning with conversion.** A rectangular lot is 18 pl by 35 ba. Compute its area in m^2, hmk, and ft^2.

3. **Coco-milk mass from volume.** A keg holds 12 grd of coco-milk. Using ρ_{cmlk}, find the mass in kg and in mangos (mgo).

4. **Flow over a tide.** A still produces 4.2 ibr every tide. Report the average flow in L/s and in US gal/min.

5. **Pace to mph.** A runner holds 2.0 scy for one sunset (sst). Give the distance in meters and the average speed in mph.

6. **Fire to light (energy chain).** The beacon runs at 3.5 trc for 1.5 td. How many firechips (fch), kWh, and BTU is that?

7. **Wood-to-heat estimate.** If dry wood has $e_{\text{wood}} \approx 16$ MJ/kg, how many kilograms of wood are equivalent to 18 fch? Also report in pounds.

8. **Raft volume.** A rectangular raft is 40 pl long, 60 ba wide, and 12 ba thick. Find its total volume in cubic meters and in liters.

9. **Market basket (mixed units).** A trader brings 18 crb, 12 mgo, and 6 cn. Find the total mass in kg and in stones (stn).

10. **Lagoon in bananas (two ways).** A lagoon is labelled 0.62 imi. Compute its length in bananas (ba) using (i) direct conversion, and (ii) via meters then bananas.

11. **From barrels to pace.** A drip system delivers 0.85 ibr per nap. How many csh per minute is that? Then, if each person drinks 3 csh per sunset, how many people can you serve continuously?

12. **Cart cruise.** A cart moves at 2.5 scy for one tide. How far does it travel in meters and in island miles (imi)?