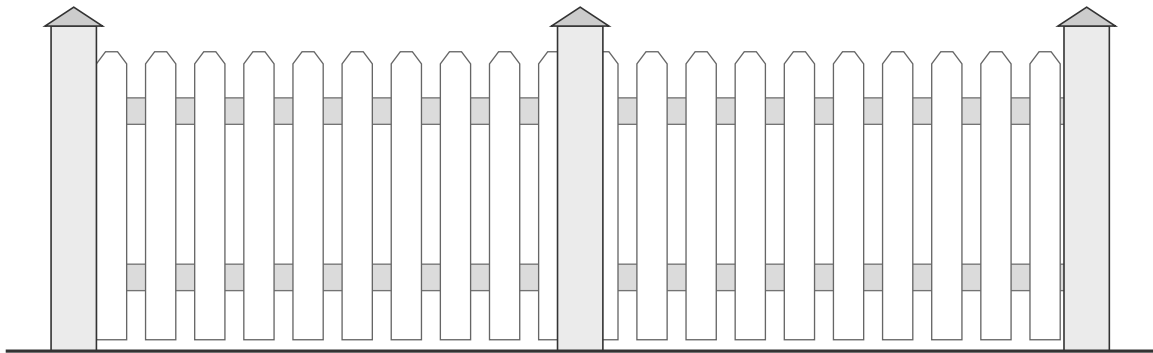


BUILT BY NUMBERS • BOOK 2

Fences That Stand Straight

The Weekend Builder's Math for Posts, Pickets, Privacy Boards
and a Gate That Stays Square, on Flat Ground or a Slope



Square, level and costed before you dig.

SIZU RIATTO

How to use these sheets

Print as many copies as you like, and take a clean sheet outside so the book can stay indoors, away from the concrete. **Template A** is the shopping list: quantity, spare, order, unit price and total for every material. **Template B** is the weekend plan, with the waits for concrete and stain written in. **Template C** is the set-out and cutting sheet: every post center measured from one zero, the fall at each post, a 3-4-5 corner and the cutting list.

Each sheet is explained, with the book's own fence worked in full, in the chapters: the posts in Chapter 1, the set-out in Chapter 2, the concrete in Chapter 3, the cuts in Chapter 5, the gate in Chapter 8 and the stain in Chapter 9, and the plan in Chapter 10. The calculators at mathworkbook.netlify.app/calculators do the same arithmetic with your numbers.

These are planning sheets, not an engineering design. Call 811 (or your local service) before you dig, and follow your building department and the product labels.

Quick Reference

One page to photograph or photocopy and take to the build. Every line is a Rule of Thumb from its chapter.

■ QUICK REFERENCE

The nine rules

1. Count the bays, then add the posts. Bays = $\text{run} \div \text{largest spacing, rounded up}$. Posts = **bays + 1** on a straight run, = **bays** on a closed loop. A gate bay is a bay.

2. One boundary, one string, one zero. The string goes inside the boundary. Measure **every** post from **one zero**. Square corners with the biggest **3-4-5** that fits. Slope % = $\text{fall} \div \text{length} \times 100$; **5% = 50 mm a meter = 0.6 in a foot**.

3. A cylinder with a post in it. Depth: **half the height above ground**, unless a local rule or the frost line says deeper. Width: **three post widths**. Concrete = $\pi \times r \times r \times \text{depth}$ - the post. Bags: round up each hole, **plus one**.

4. Compare per meter, then per year. Per meter = per foot $\times 3.2808$. Per year = $\text{total} \div \text{the years you expect}$. The more expensive fence pays only if it lasts longer by the same ratio.

5. Clear span, count up, one zero. Gap = $(\text{span} - n \times w) \div (n + 1)$; on a gate flush at both edges, $(\text{leaf} - n \times w) \div (n - 1)$. Wet boards shrink about **6 mm** each. Allow **3 mm** a saw cut, add **5%**.

6. The fall decides; plumb stays plumb. Fall per bay = $\text{spacing} \times \text{slope}$. Racked rail = $\text{level length} \times \sqrt{1 + \text{slope}^2}$. Stepped: one fall per bay, and a triangle under each bay.

7. Speed squared, height squared. Wind push $q = 0.613 \times V^2$ (Pa, V in m/s). Each post carries **spacing $\times$ height**; the turn at the ground is $\text{push} \times 0.55 \times \text{height}$. Your local rule decides.

■ QUICK REFERENCE

8. Brace pushed, hinges spread. Brace from the **bottom hinge corner to the top latch corner**, 30-60°. Pull on each hinge = $W \times d \div h$.

9. Every face, the low end, rounded up. Gallons = area $\times$ coats $\div$ the **low end** of the label's coverage. Stain when water soaks in, not when it beads.

Stop. Over the local height limit, on a disputed line, over buried services, in a hurricane zone, around a pool, holding back soil, or fixed to the house: ask first.

Template A — The Shopping List

A clean printable copy is at mathworkbook.netlify.app/go/fence-shopping-list.

Fence: _____

Length × height: _____

Date of prices: _____

Material	Quantity	Spare	To order	Unit price	Total
Line posts					
Gate posts					
Post caps					
Pickets or boards		5%			
Rails (by stock length)					
Gate frame and brace					
Concrete (bags)		1 bag			
Gravel (bags)					
Nails / screws					
Rail brackets					
Hinges and latch					
Stain (gallons)					
Delivery / auger rental					
Total					

Template B — The Weekend Plan

A clean printable copy is at mathworkbook.netlify.app/go/fence-weekend-plan.

Your digging time per hole (time your first one): _____ Helper: _____

Weekend 1: set out, dig, set posts, rails, pickets or boards

Time	Job	Hours	Done / notes
	Services marked (811 or local); boundary found		
	Set out: stakes, string, post centers from zero		
	Dig the holes; gravel in; treat cut post ends		
	Set the gate posts, then the line posts, plumb		
	The wait: cut pickets, sort boards, cut rails		
	Rails on brackets		
	Pickets or boards, with the story pole		

The wait. Fast-Setting mix: hours before rails go on: _____

Weekend 2: the gate

Time	Job	Hours	Done / notes
	Build the gate flat: frame, brace, diagonals		
	Hang the gate; latch; check the gaps		
	Post caps; clean up; offcuts away		

The second wait. Stain goes on when water soaks in instead of beading. Drop-test date: _____ Stain date: _____

Template C — The Set-Out and Cutting Sheet

A clean printable copy is at mathworkbook.netlify.app/go/fence-setout-sheet.

The line

	The book's fence (A / B)	Yours
Length of fence, latch post center to end post center	7.2 m	_____
Gate opening, clear	1.0 m	_____
Post spacing (largest allowed)	2.4 m / 1.8 m	_____
Bays (rounded up) and posts (bays + 1, plus the hinge post)	3, 5 / 4, 6	_____
Offset in from the boundary	_____	_____

Post centers, all from one zero, and the fall

Post	From zero, planned	From zero, marked	Fall	Hole depth
G1 (hinge)	0			
G2 (latch)				
P1				
P2				
P3				
P4				
P5				

A corner or a return (3-4-5)

	Side 1	Side 2	Diagonal should be	Diagonal measured
Corner	_____	_____	_____	_____

The cutting list

Piece	Length	How many	From stock length	Offcut
Pickets or boards				
Bay rails				
Gate rails				
Gate brace				
Posts				