

Your first house *on paper*

A workbook to measure, draw, count and make.



01

MEASURE

Your room and your plot

02

PLAN

Rooms inside the legal box

03

COUNT

Materials with checked
evidence

04

MODEL

Fold, test and ask better
questions

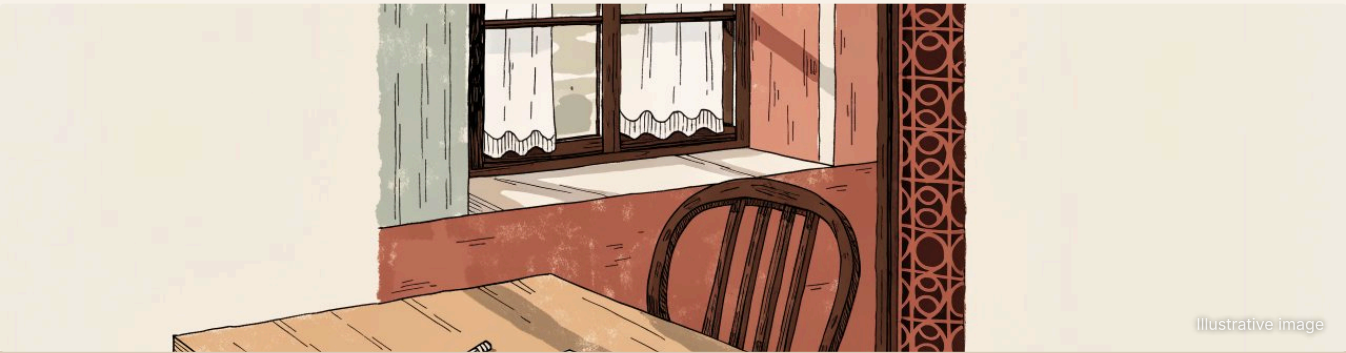
A pencil is *a place to begin.*

A house becomes easier to understand when you draw it yourself. Start with a room you know. Then try a plot, a plan, a material sheet and a paper model. Keep your first attempt. You will see what changed.

01	Measure	03
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HOW TO READ THIS BOOK

Write lightly. Use a ruler. Blank lines are yours to fill. Read the source before using a number. Example plots and room sizes are practice inputs. Generated scenes are illustrative. Bring your completed pages to a designer.





CHAPTER 01

Measure

Before drawing a new house, look closely at a room you already use. Where is the door? What blocks the window? Which part feels easy to move through? Your observations become the brief.

Source: Original practice worksheet; drawing conventions: IS 962:1989, cls. 10.2.1, 10.2.6 and 11.2. Reader measurements are observations, not code dimensions.

Who will *call it home?*

Ask the people who will use the house. Listen before you place a wall. Write names or activities beside the questions; a good brief starts with everyday life.

PEOPLE

- ☐ **Who lives here, and who visits?**
Names and needs _____
- ☐ **Who needs help moving, bathing or using stairs?**
Now and in the future _____

ROUTINES

- ☐ **Where do we cook, eat, study and rest?**
Activities that need their own space _____
- ☐ **What must we store?**
Furniture, utensils and belongings _____

PLACE

- ☐ **What is our address and approving authority?**
City / authority _____
- ☐ **What do we notice about sun, breeze, rain and neighbours?**
Observation / season _____

A WISH

- ☐ **What would make daily life easier?**
My priority _____



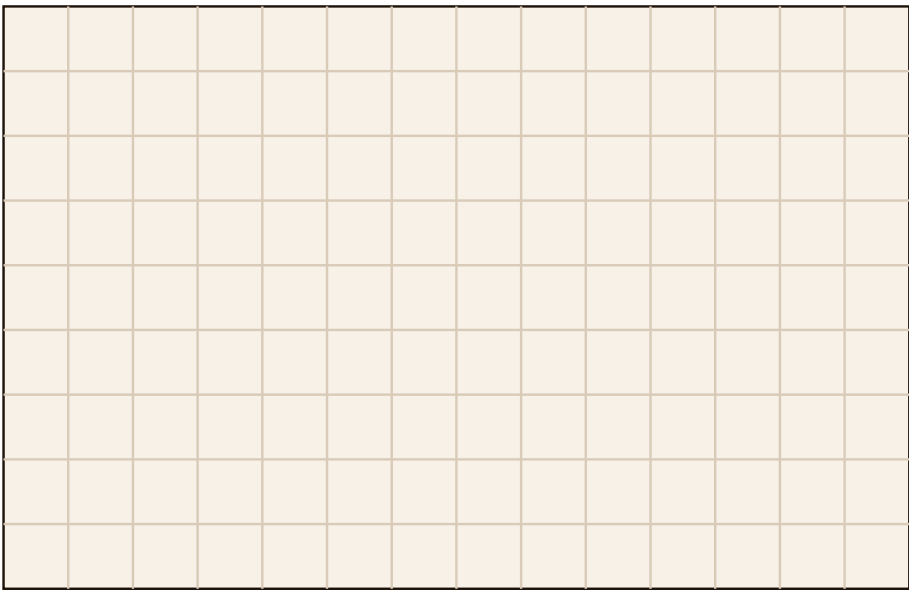
Illustrative image

Measure a room.

Draw what is there.

Use a tape with an adult if needed. Measure between finished wall faces. Stay on the floor. Sketch the shape first, then add doors, windows and furniture.

MY ROOM · MEASURE THE FINISHED INSIDE FACES



Look down
from above.

Keep one
square size
throughout.

Length ____ m Width ____ m Height ____ m

Length per square ____ m Floor area ____ m²

Door ____ Window ____ Fixed furniture ____

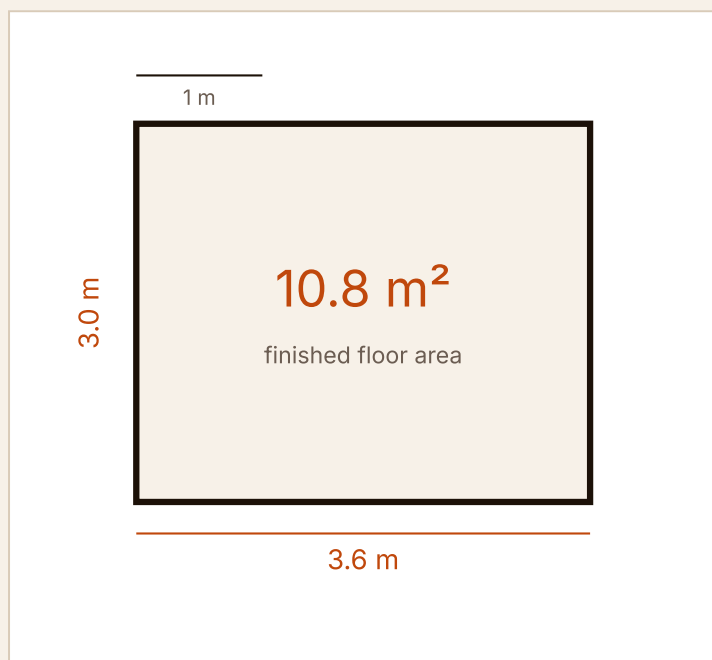
Draw the door open. Mark what stays and what moves.

Keep the unit. Record lengths in metres. Choose what a square represents and keep that choice for the whole drawing. Mark a scale bar with the same value.

Check the awkward parts. A recess, a pillar or a fixed cupboard changes the usable space. Measure it. Do not smooth it away to make the sketch look tidy.

Area and width *are different checks.*

This teaching room is a practice example. Area tells you how much floor there is. Width tells you how narrow it is. Height is a separate check above the floor.



$$3.0 \times 3.6$$

= 10.8 m² of floor. Your room: ____ × ____ = ____ m².

Dated room baseline. A single habitable room is at least 9.5 m² and 2.4 m wide. For this flat-ceiling practice room, the dated height baseline is at least 2.75 m from finished floor to the underside of the ceiling slab. Pitched roofs, beams and air-conditioned rooms have separate qualifications. Confirm the applicable local rules.

My area ____ m²

My width ____ m

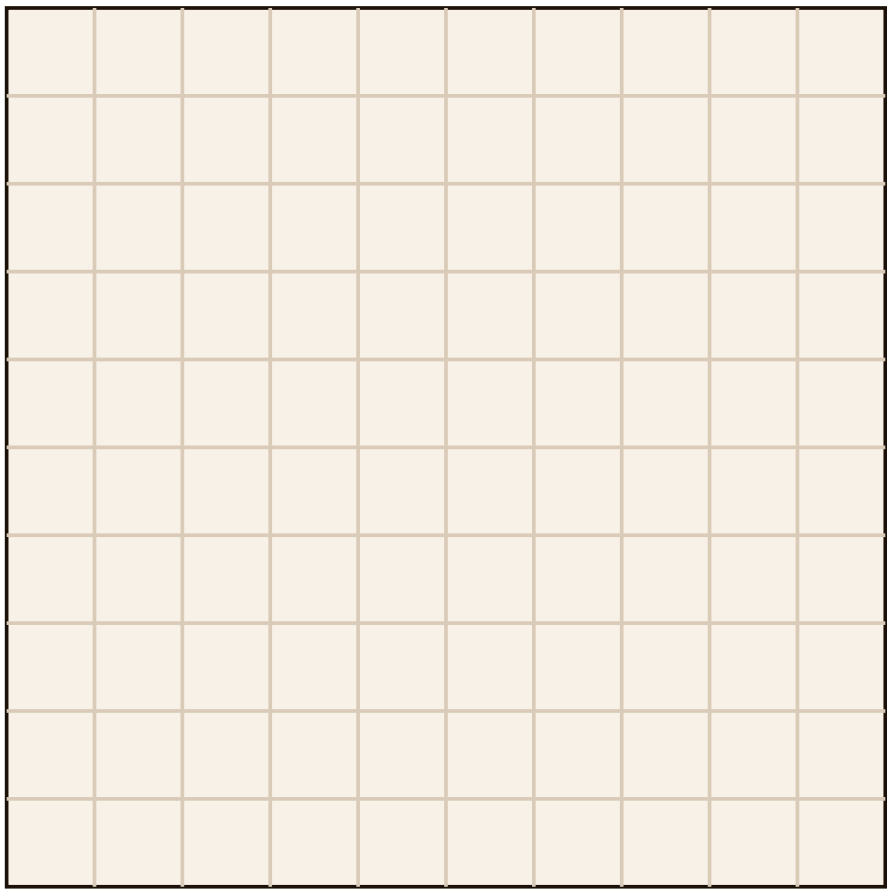
My height ____ m



Your plot, *one square at a time.*

Try the Rajkot practice plot. Draw its boundary on this grid. Mark the road, entry, north direction and anything you would need to check on a real site.

20 m × 20 m · RAJKOT PRACTICE PLOT



— 2 m · one square

ROAD SIDE · 12 m ROAD

Keep it to scale. Use the square length shown. Put a mark where a boundary falls between grid lines. The scale bar still works if the printer changes the page size.

Try your own plot. On a fresh copy, write your surveyed dimensions and choose a square length that fits. Label that scale. A sketch cannot replace a boundary survey.



CHAPTER 02

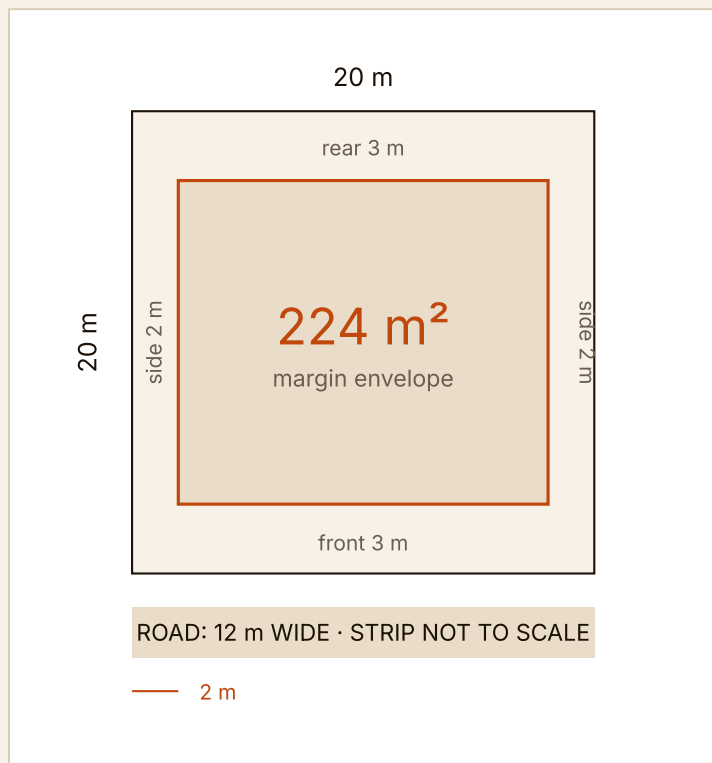
Plan

The plot is not all building space. First draw the box allowed by the rules. Then arrange the family's activities inside it. A favourite room must still fit the place.

Source: Assumed RUDA example: Residential R1 zone, Dwelling 1-2, 400 m² plot, one 12 m frontage road; no special restrictions assumed. CGDCR 2017 Part II, Table 6.24 p. 23 (road), Table 6.26 p. 24 (rear/sides), Table 6.10 p. 15 (base FSI). Verify amendments and authority conditions.

Draw the margins *before the rooms.*

Use Book 1's Rajkot example: a square plot on a road. The shaded box shows the space inside the selected margins. It is a teaching example, not a permission to build.



Envelope arithmetic

$$(20 - 2 - 2) \times (20 - 3 - 3)$$

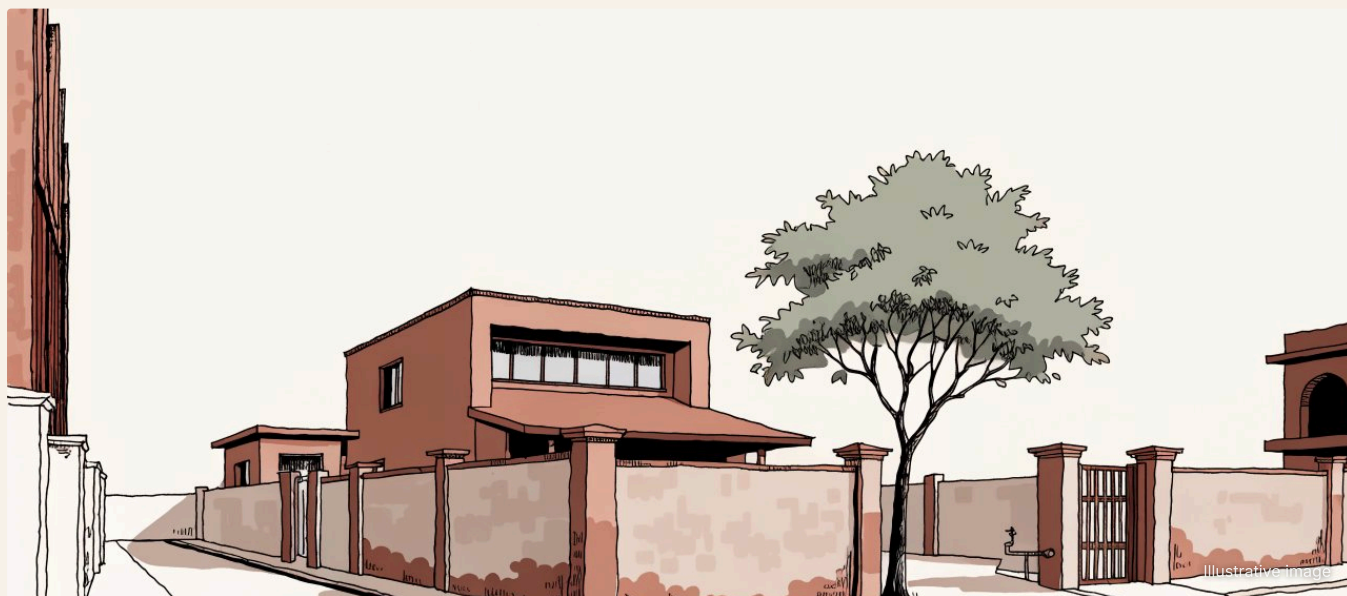
= 224 m², or 56% of the 400 m² plot.

Assumed R1 base FSI: 1.8

$$400 \times 1.8$$

= 720 m² of total counted floor area. FSI is not the footprint.

Height, parking, stairs and other controls still apply. The envelope percentage is arithmetic, not a coverage rule.

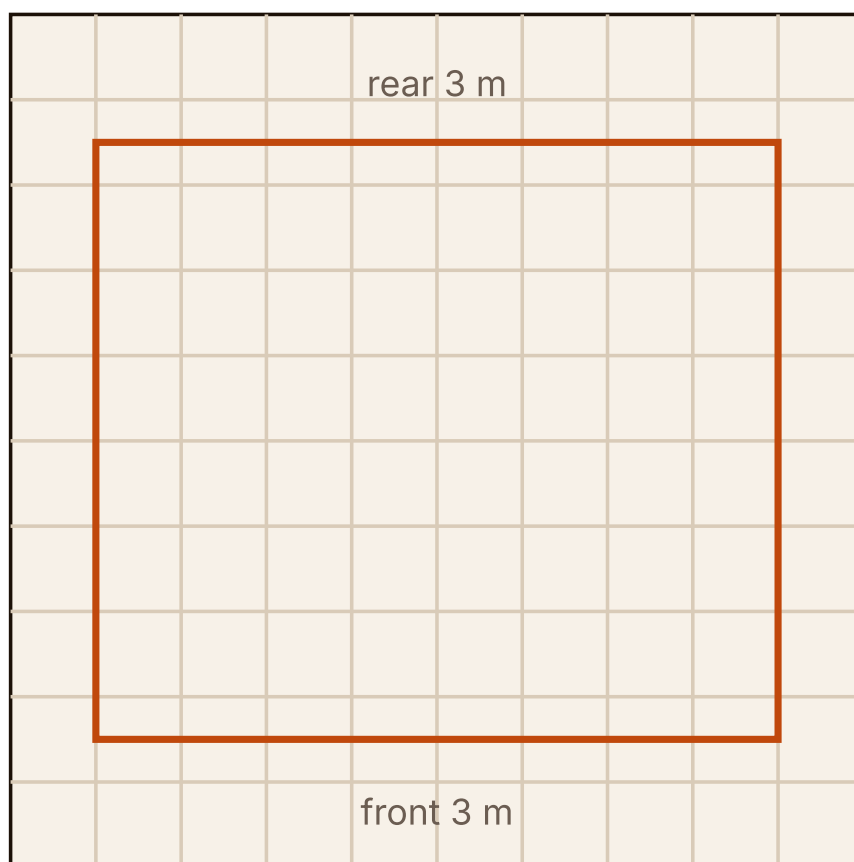


Assumed RUDA example: Residential R1 zone, Dwelling 1-2, 400 m² plot, one 12 m frontage road; no special restrictions assumed. CGDCR 2017 Part II, Table 6.24 p. 23 (road), Table 6.26 p. 24 (rear/sides), Table 6.10 p. 15 (base FSI). Verify amendments and authority conditions.

Now put your rooms *inside the box.*

Sketch an entry, living space, kitchen, sleeping space, bath and WC. Leave room for walls and movement. You can leave some of the box open; you do not have to fill it.

DRAW THE OUTER WALLS INSIDE THE RUST LINE



— 2 m · one square

12 m ROAD · ENTRY SIDE

Draw from outside in. Keep the outside of the walls within the envelope. Then measure each finished room. A line on paper must become a wall with real thickness.

Test the plan. Label rooms and dimensions. Draw doors open. Mark which walls can receive windows. Keep the margins clear and reserve parking and services for review.

Small enough to fit. *Big enough to use.*

Check the finished room area and its width together. These are dated baseline checks. Furniture, access, local rules and the people using the room may ask for more.



01

Habitable room

Single-room baseline

Width at least 2.4 m. My area ____ m²; my width ____ m.

9.5m²

minimum floor area



02

Separate kitchen

Width at least 1.8 m. My area ____ m²; my width ____ m.

5m²

minimum floor area



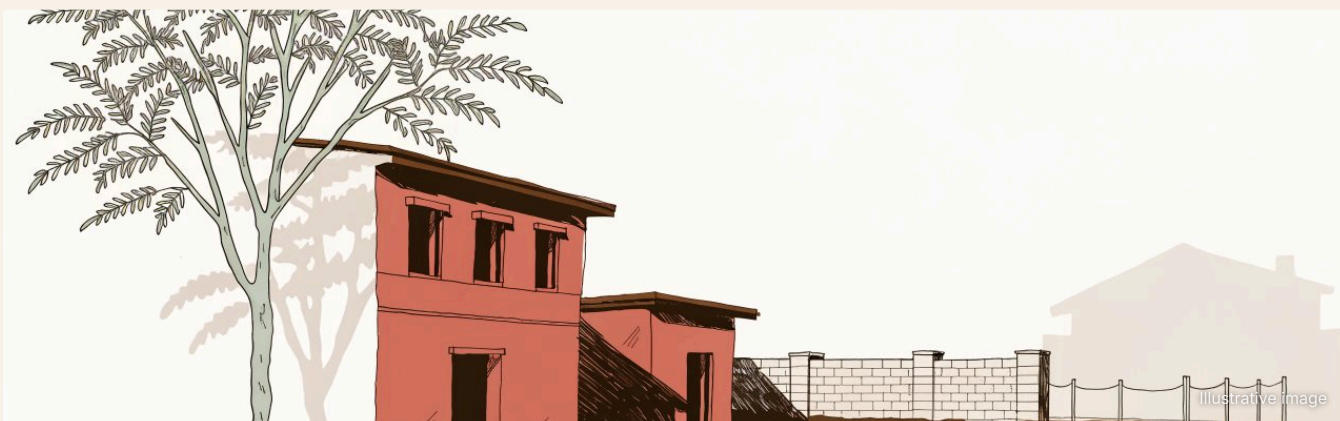
03

Separate bath and WC

Bath: width at least 1.2 m. WC: area at least 1.1 m² and width at least 0.9 m. Mark both on your plan.

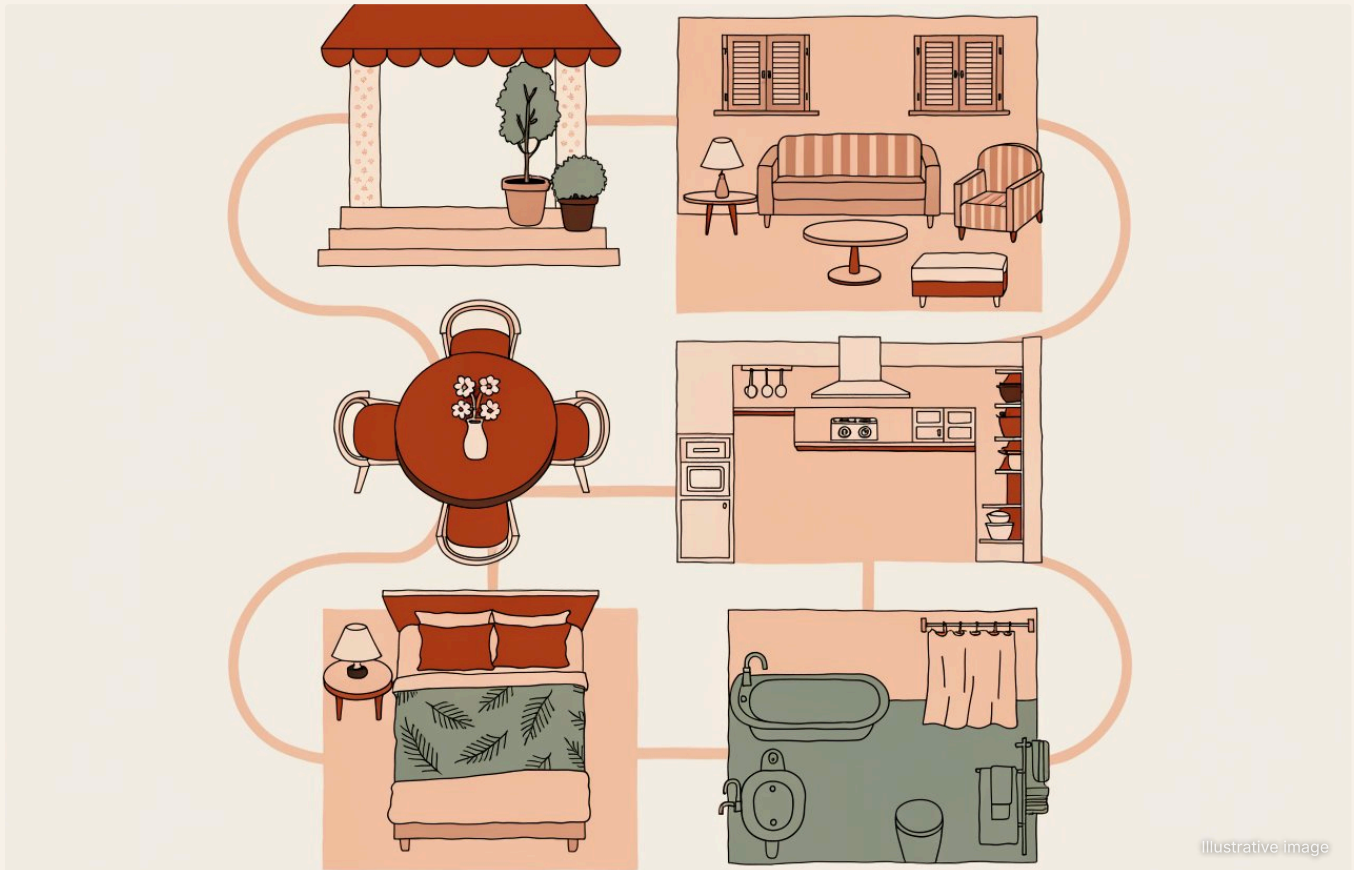
1.8m²

bath minimum area



Which rooms *belong together?*

A plan is also a set of journeys. Think about carrying food, welcoming a visitor and reaching the bathroom at night. Draw lines between the activities that need to connect.



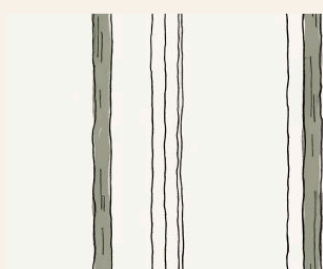
illustrative image

Keep close. Rooms or activities I want near each other:

Why? _____

Keep quiet. Activities that need privacy or less noise:

My route to test: _____

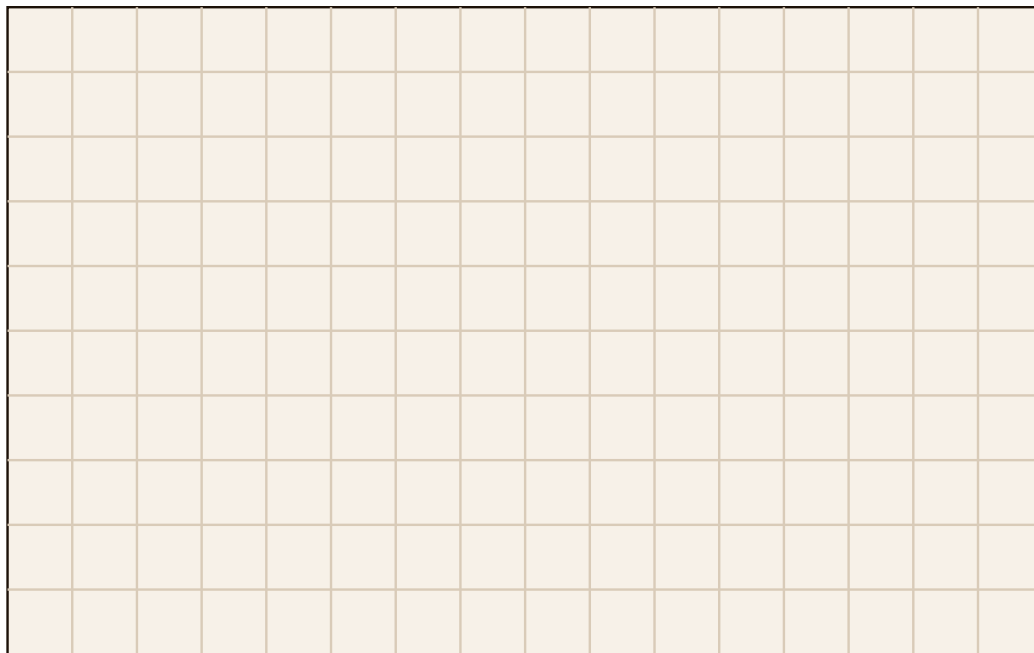


illustrative image

Draw the furniture *before you decide.*

Trace a room from your plan onto this grid. Keep its scale. Measure real furniture or use its product drawing. Draw doors, chairs and drawers in use, then walk through the plan with a pencil.

TRACE A ROOM FROM YOUR PLAN. KEEP ITS SCALE.



Room ____ Length per square ____ m

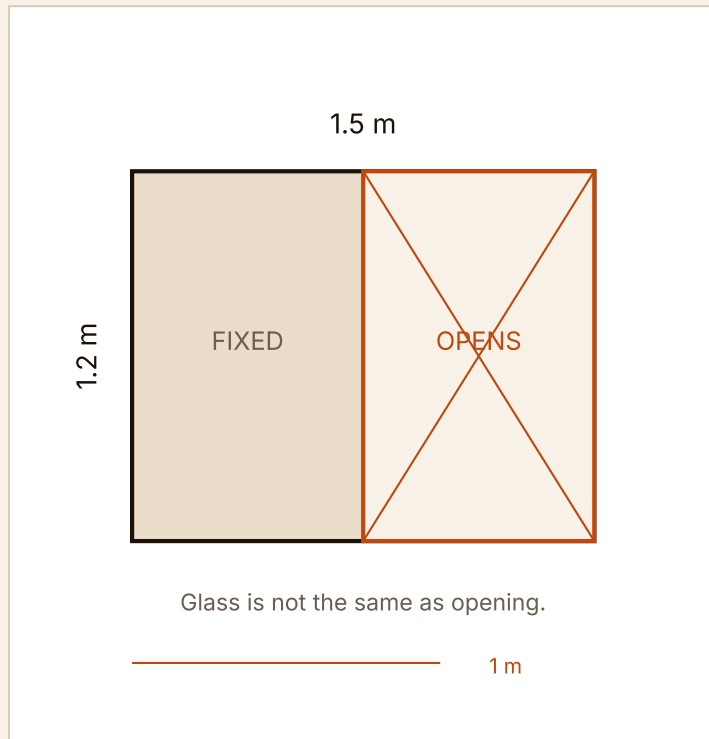
Furniture ____ × ____ m Clear route ____ m

Make the route visible. Trace entry to seat, bed or cupboard. Circle anything that blocks the route. Check occupied chairs as well as empty chairs.

Revise one thing. I moved _____ because _____
The change helps _____



Count the part *that opens.*



A window can contain fixed glass. Use this bedroom exercise to separate its full size from its operable area. Then mark an air path on your room plan.

Overall window

$$1.5 \times 1.2$$

= 1.8 m². Half is fixed, so only 0.9 m² opens.

Wet-hot exercise room

$$10.8 \div 6$$

= 1.8 m² required by the model provision.

Shortfall: 0.9 m².

Doors do not count. Opening area does not prove good airflow. This wet-hot exercise is separate from Rajkot's composite climate.



An artistic illustration of a construction site. In the foreground, a large, stepped pyramid of red and grey bricks sits on the ground. To its left, a tall, slender tree with a white trunk and sparse green leaves stands. Further left, a decorative stone pillar with a tiered top is visible. In the background, a building's steel frame is under construction, with a person standing near its base. Stacks of bricks and pipes are scattered on the ground. The overall style is a hand-drawn sketch with colored washes.

CHAPTER 03

Count

Counting starts with a drawing and a unit. A volume is not a brick count. A steel weight is not a structural design. Keep the measurement, the factor and its source on the same sheet.

Source: Factors: CPWD Delhi Analysis of Rates (DAR) 2021, Vol. I: item 6.4.1 (230 mm brick wall, 1:4), 6.13.1 (115 mm wall, 1:3), 5.1.2 (nominal 1:1.5:3 concrete; estimating example), 4.1.8 (PCC 1:4:8); cement bag 50 kg. Brick factors apply to F.P.S. non-modular burnt-clay bricks, class designation 7.5. Approximate nominal mass per metre $\approx D^2/162$, with D in mm. This estimate gives 0.889 kg/m for 12 mm and 1.58 kg/m for 16 mm. IS 1786 Table 1 lists 0.888 kg/m for 12 mm. A 12 m length is approximately 10.7 kg. Steel mass: IS 1786:2008, cl. 6.2/Table 1 and cl. 7.2.1; nominal-mass tolerances: Table 2. $D^2/162$ is a rounded estimating formula. IS 2502:1963, cl. 6.1 concerns bending procedure. Delhi nominal quantities for checking an order; your engineer's design and mix come first.

Measure the work *before the material.*

Choose a wall from your plan. Record its length, height and specified thickness. Work in metres. Subtract the volumes of openings before applying a checked material factor.

ELEMENT / LOCATION _____

Length ____ m × height ____ m × thickness ____ m

Gross volume ____ m³ Openings to deduct ____ m³

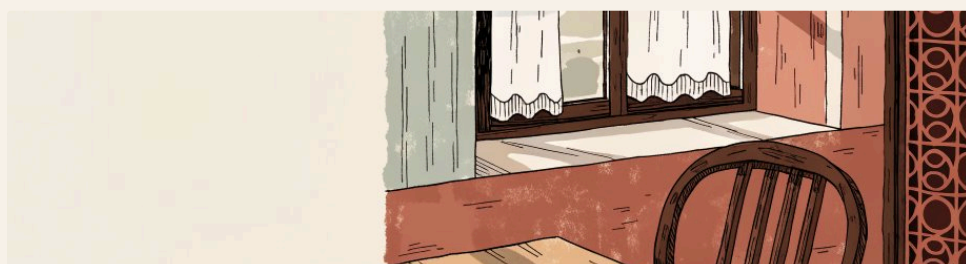
Net volume ____ m³ Drawing revision _____

Material / specification _____

Checked by _____ Question still open _____

Keep unlike work separate. Masonry, concrete and finishes use different measurements and specifications. Identify the element before you copy a factor.

Use a drawing you can name. Write its revision beside the quantity. If a dimension is missing, ask for it. An estimate should show what was measured.

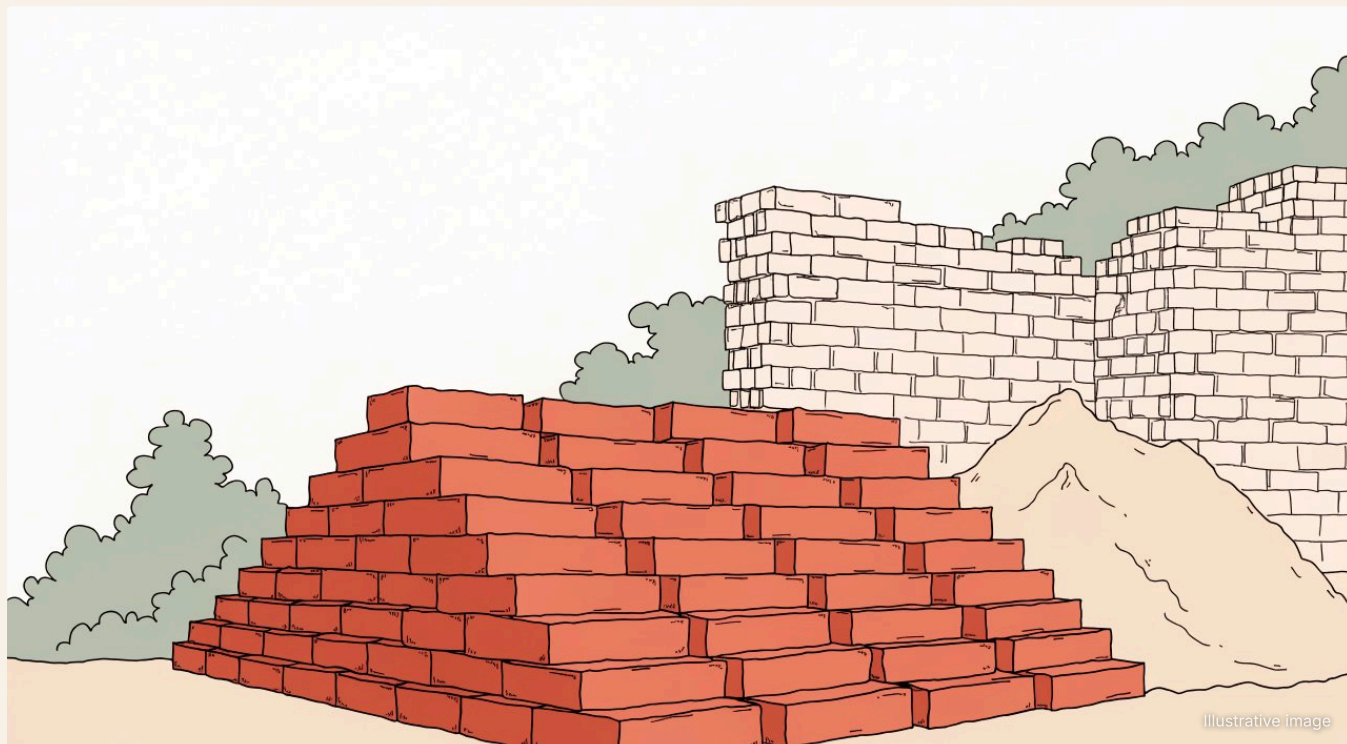


Illustrative image

D²/162 is a rounded estimating formula. IS 2502:1963, cl. 6.1 concerns bending procedure. Delhi nominal quantities for checking an order; your engineer's design and mix come first. CPWD GCC 2023, cls. 6–9 and 11: measurement, payment, drawings and specifications; private-contract drafting model only.

A quantity needs *a checked factor.*

These are the factors CPWD uses in its own rate analysis. Use them to check an order, then let your engineer confirm the mix and the wastage.



Illustrative image

494 bricks/m³

Bricks in one cubic metre of 230 mm wall (56.5 per m² of 115 mm wall).

CPWD DAR 2021, Vol. I, items 6.4.1 and 6.13.1

8 bags/m³

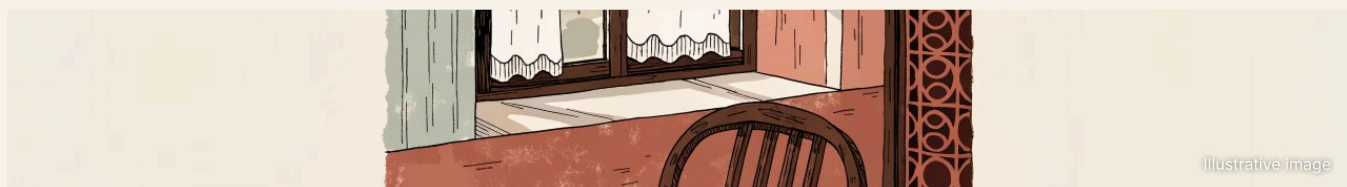
Cement estimate for the DAR 1:1.5:3 concrete item: 8 assumed 50 kg bags/m³; PCC 1:4:8: 3.4 bags/m³. These quantities do not establish concrete strength.

CPWD DAR 2021, Vol. I, items 5.1.2 and 4.1.8

$D^2 \div 162$ kg/m

Approximate nominal mass per metre $\approx D^2/162$, with D in mm. This estimate gives 0.889 kg/m for 12 mm and 1.58 kg/m for 16 mm. IS 1786 Table 1 lists 0.888 kg/m for 12 mm. A 12 m length is approximately 10.7 kg.

IS 1786:2008, cl. 6.2/Table 1 and cl. 7.2.1



Illustrative image

estimating example), 4.1.8 (PCC 1:4:8); cement bag 50 kg. Brick factors apply to F.P.S. non-modular burnt-clay bricks, class designation 7.5. Approximate nominal mass per metre $\approx D^2/162$, with D in mm. This estimate gives 0.889 kg/m for 12 mm and 1.58 kg/m for 16 mm. IS 1786 Table 1 lists 0.888 kg/m for 12 mm. A 12 m length is approximately 10.7 kg. Steel mass: IS 1786:2008, cl. 6.2/Table 1 and cl. 7.2.1; nominal-mass tolerances: Table 2. $D^2/162$ is a rounded estimating formula. IS 2502:1963, cl. 6.1 concerns bending procedure. Delhi nominal quantities for checking an order; your engineer's design and mix come first.

Bricks and bags: *show your working.*

Fill the boxes with your own measurements.
The factors are printed beside each line, with
their source at the foot of the page.

BRICKS (230 mm wall) · net volume ____ m³ × 494 = ____ bricks

BRICKS (115 mm wall) · net area ____ m² × 56.5 = ____ bricks

1:1.5:3 CONCRETE (estimate only) · volume ____ m³ × 8 = ____ bags of cement

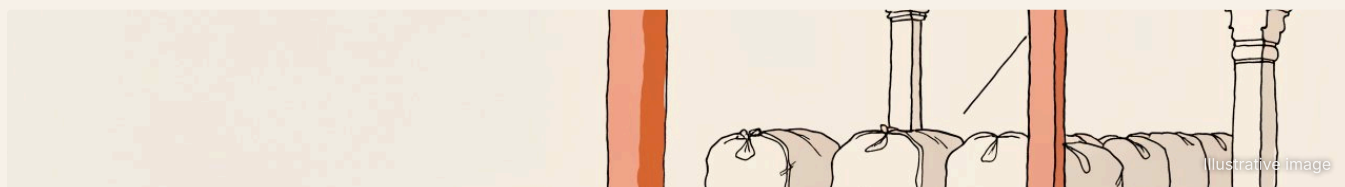
PCC 1:4:8 · volume ____ m³ × 3.4 = ____ bags of cement

MORTAR (1:4) · net masonry volume ____ m³ × 1.9 = ____ bags

Total bags ____ × 50 kg = ____ kg Checked by _____

Copy precisely. Record the material description, analysis edition, item locator and unit. A factor for a different masonry type or mix is not interchangeable.

Stop before ordering. These are nominal quantities. Breakage, wastage and rounding to full bags are extra; agree them with your engineer or contractor.



estimating example), 4.1.8 (PCC 1:4:8); cement bag 50 kg. Brick factors apply to F.P.S. non-modular burnt-clay bricks, class designation 7.5. Approximate nominal mass per metre = $D^2/162$, with D in mm. This estimate gives 0.889 kg/m for 12 mm and 1.58 kg/m for 16 mm. IS 1786 Table 1 lists 0.888 kg/m for 12 mm. A 12 m length is approximately 10.7 kg. Steel mass: IS 1786:2008, cl. 6.2/Table 1 and cl. 7.2.1; nominal-mass tolerances: Table 2. $D^2/162$ is a rounded estimating formula. IS 2502:1963, cl. 6.1 concerns bending procedure. Delhi nominal quantities for checking an order; your engineer's design and mix come first.

Steel: count length, *then find its mass.*

Copy a bar mark from the engineer's approved schedule. It gives diameter, shape, cut length and count. Multiply count by cut length, then multiply total length by the checked mass per metre.

BAR MARK ____ Approved schedule revision ____

Diameter D ____ mm Scheduled cut length ____ m

Number of identical bars ____ Total length ____ m

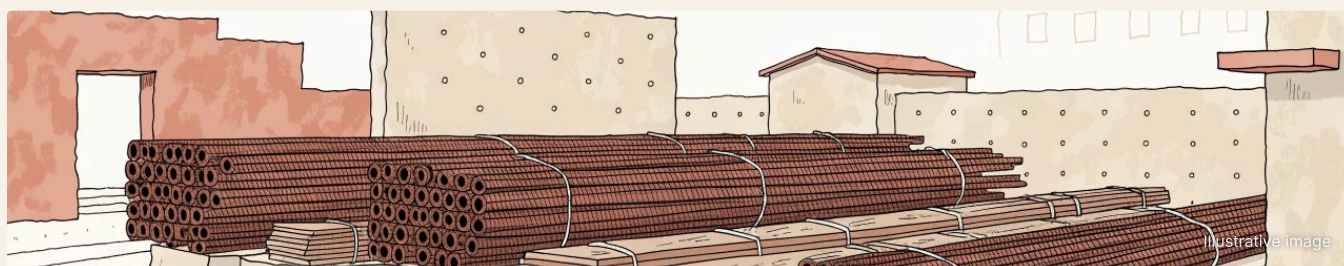
Approximate kg per metre $\approx D \times D \div 162 =$ ____ kg/m

Total length ____ m $\times$ ____ kg/m = ____ kg

Hooks and laps included in schedule? ____ Reviewer ____

Diameter enters twice. Approximate nominal mass per metre $\approx D^2/162$, with D in mm. This estimate gives 0.889 kg/m for 12 mm and 1.58 kg/m for 16 mm. IS 1786 Table 1 lists 0.888 kg/m for 12 mm. A 12 m length is approximately 10.7 kg.

Weight cannot choose the bars. The engineer decides reinforcement. Use scheduled lengths, including the approved bends, hooks and laps. Do not size bars from plot area.



$D^2/162$ is a rounded estimating formula. IS 2502:1963, cl. 6.1 concerns bending procedure. Delhi nominal quantities for checking an order; your engineer's design and mix come first. IS 2502:1963, cl. 6.1: bending procedure. Use approved bar schedules; counting cannot establish structural capacity.



CHAPTER 04

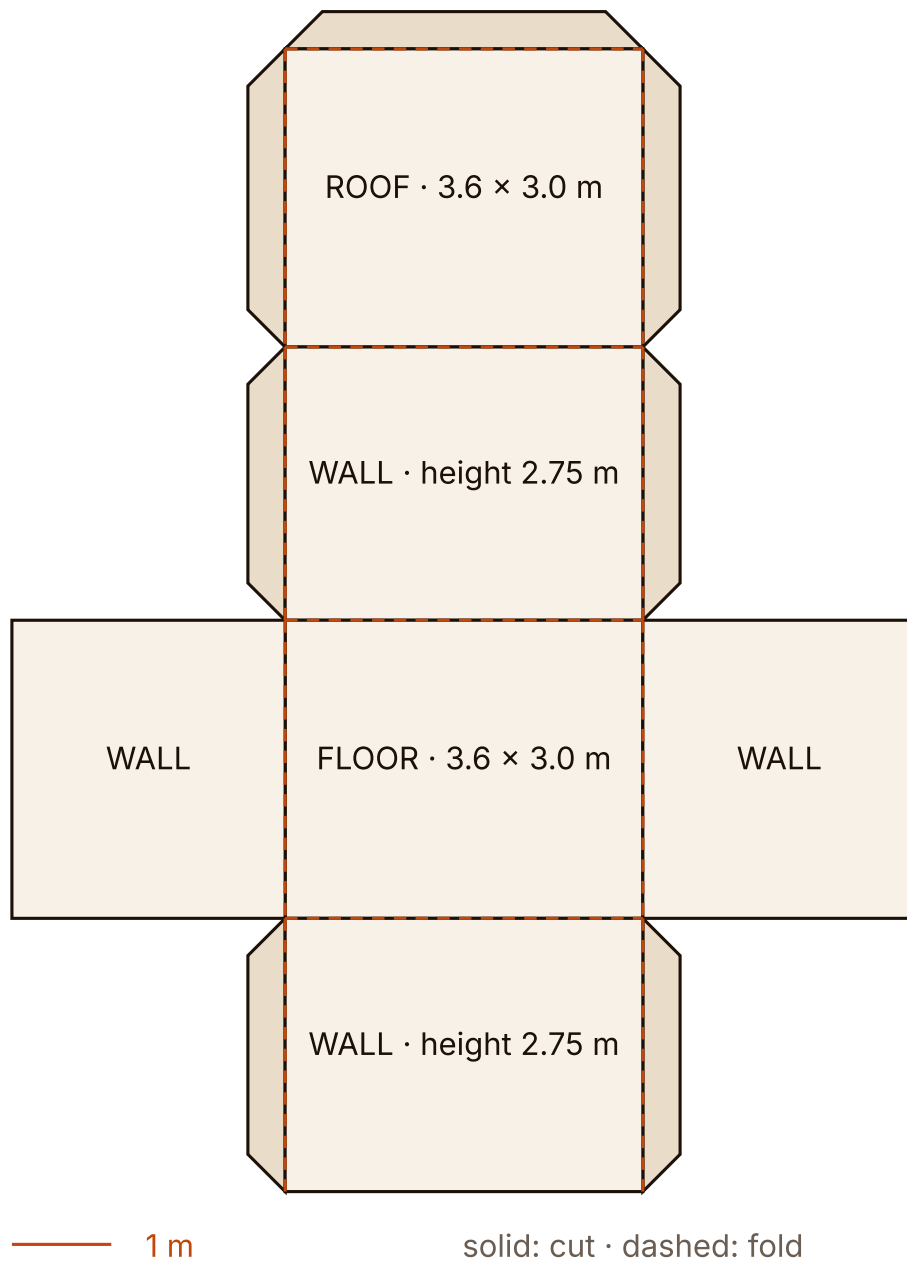
Model

Fold a flat drawing into a small room. You will see the floor, walls and roof together. Then check what you learned. Good questions matter more than a perfect first sketch.

Source: Practice room: $3.0 \times 3.6 = 10.8 \text{ m}^2$; NBC 2016 Part 3 (dated baseline), cls. 12.2.2 and 12.2.1. Example dimensions, not a recommended size. Local adoption of SP 7:2026 is unverified.

A room you can *fold into shape.*

Print this net. Cut around the outside and keep the shaded tabs. Score the dashed lines gently. Fold the walls up, glue their corner tabs, then close the roof. Ask an adult for help with scissors.



Same scale on every face. Floor and roof match. Wall height is the dated room baseline used as a practice input. The scale bar gives the model's proportion.

Look inside first. Sketch a door and windows before folding. This is a room shell for learning, not a structure or a construction detail.

What do *you remember?*

Try these without looking back. Write your working as well as your answer. A mistake shows which page to revisit. The answers are on the closing page.

A · What is the floor area of the 3.0×3.6 m room?

B · How much of the Rajkot example lies inside the margins?

C · Is the 56% envelope a universal coverage limit?

D · A 1.5×1.2 m window is half fixed. What area opens?

E · Can a bar-weight calculation prove a house is safe?

My question for a designer _____

Check the unit. An area answer needs an area unit. A share of a plot needs its example and assumptions. A fixed window is not an opening.

Explain in words. If a number sounds like a rule for every house, ask where it came from and where it applies.



Original room/window exercises; Model Building Bye-Laws 2016, cl. 4.30.1.1 Note 1. Assumed RUDA example: Residential R1 zone, Dwelling 1-2, 400 m² plot, one 12 m frontage road; no special restrictions assumed. CGDCR 2017 Part II, Tables 6.24 p. 23 and 6.26 p. 24. Structural review: CGDCR procedure cl. 4.4.3 and Form 2A. Example arithmetic, not approval.

Before you show *your first plan.*

Put your drawings and worksheets together. Use this page to review them with a parent, teacher or designer. Write down what remains uncertain. Unanswered questions belong in the brief.

MEASURED

- ☐ **Have I written units and a scale bar?**
Plot and room sheets
- ☐ **Did I record real boundaries and finished room dimensions?**
Survey still needed? _____

PLANNED

- ☐ **Are the outside walls inside the practice envelope?**
Check every side
- ☐ **Did I test open doors, furniture and routes?**
Change to make _____
- ☐ **Did I check room geometry and openable windows?**
Local rule to confirm _____

COUNTED

- ☐ **Does every factor have a source and matching unit?**
Missing evidence stays blank
- ☐ **Does steel come from an approved bar schedule?**
Engineer / revision _____

REVIEWED

- ☐ **Who will confirm local rules and design the real house?**
Name / next question _____



Keep drawing. *Keep asking.*

Your workbook is now a conversation with a designer. Bring the brief, the measured sheets, the plan and the questions. A paper house helps you explain what you need; a real house needs a checked design.

A · Room area

$3.0 \times 3.6 = 10.8 \text{ m}^2$. Area, width and height are separate checks.

B · Rajkot envelope

$(20 - 2 - 2) \times (20 - 3 - 3) = 224 \text{ m}^2$. Other planning controls still apply.

C · Coverage

No. The 56% is arithmetic for the assumed Rajkot plot. It is not a universal coverage rule.

D · Openable area

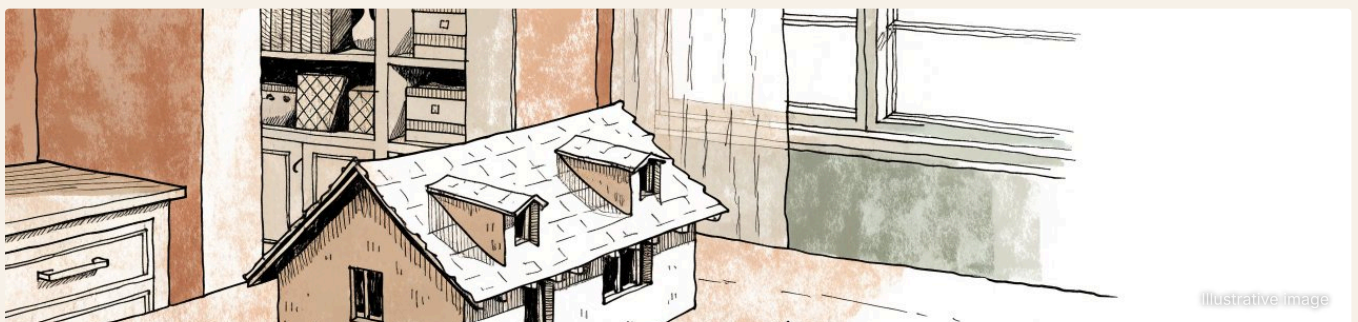
$1.5 \times 1.2 = 1.8 \text{ m}^2$ overall. With half fixed, 0.9 m^2 opens.

E · Structural safety

No. Bar weight measures a quantity. Loads, soil, member design and detailing need the engineer.

Your next step

Review your pages with a designer. Before ordering, have your engineer check each factor against your project's materials, specification and quantities. Explore the free tools at nirmandost.in.



illustrative image



NirmanDost

Free tools for people who build · nirmandost.in

Assumed RUDA example: Residential R1 zone, Dwelling 1-2, 400 m² plot, one 12 m frontage road; no special restrictions assumed. Original room/window arithmetic; Model Building Bye-Laws 2016, cl. 4.30.1.1 Note 1; CGDCR 2017 Part II, Tables 6.24 p. 23, 6.26 p. 24; CGDCR procedure cl. 4.4.3, Form 2A (structural design). Edition: October 2026. Local SP 7:2026 adoption and project-specific material-factor applicability remain unverified.