BIG FLOOR PLANS · COLLEGE & TRADES TRACK · 50 MINUTES

# Roof Takeoff from the Plan: teacher script

Roofing and construction-estimating students take off a gable roof from the Teaching House plan: walk the eave line on the full-size print, apply the pitch factor, and order shingles and drip edge.

**Prep:** Roll out the TP-01 print; tape a line 1 ft outside the exterior walls for the eaves. Tape a 6/12 triangle on the floor: 12 in run, 6 in rise. Print one takeoff sheet per team.

| Min | Step and what to do | Ask | Listen for |
|---|---|---|---|
| **0-5** | **Hook**<br>"The plan is flat. The roof is not. How do you order shingles?" | What is missing from the plan? | The slope. |
| **5-15** | **Walk the eaves**<br>Walk the eave line 1 ft outside the walls. Eave 58 ft; run per side 22 ft. | Why add the overhang? | The roof extends past the walls. |
| **15-25** | **Pitch factor**<br>Measure the taped 6/12 triangle: 12 in run, 6 in rise, slope? | Pitch factor? | 1.118: about 13.4 in of slope per 12 in of run. |
| **25-40** | **Area and order**<br>Area = 2 x 58 x 24.60. Squares, +10% waste, 3 bundles per square. | Order? | 28.53 squares, order 32, 96 bundles. |
| **40-45** | **Drip edge**<br>Eaves plus rakes, in 10-ft pieces. | Pieces? | 214.4 ft: 22 pieces. |
| **45-50** | **Exit ticket**<br>Individual exit ticket. | | |

## Common misconceptions

- **Learners may think:** Roof area equals the floor area. **Address it:** The roof here is 2,853 sq ft over a 2,352 sq ft footprint: overhang and slope add area.
- **Learners may think:** Pitch factor multiplies both directions. **Address it:** It stretches only the slope direction; the eave length stays the same.

## Supports

- Give a formula card: factor = square root of (1 + (rise / 12) squared).
- Multilingual learners: label eave, rake, ridge, run and pitch on the print.
- Mobility: the estimator works the math from a seat; teammates walk the eave line.

## References

- **Scenario rules**: gable roof, 6/12 pitch, 12-in overhang, 10% waste and 3 bundles per square are scenario values; follow the shingle maker's coverage on the bundle
- **Perkins V (CTE)**: postsecondary and secondary CTE program context

## Scenario sheet

The Teaching House (TP-01) footprint, 56 ft x 42 ft. Scenario roof: gable, ridge running the 56-ft way, 6/12 pitch, 1-ft overhang at eaves and rakes, 10% waste, 3 bundles per square, drip edge in 10-ft pieces at eaves and rakes.

LEARNER SHEET · ROOF TAKEOFF FROM THE PLAN

Name _____ Date _____

| Step | Work | Answer |
|---|---|---|
| Eave length | | |
| Horizontal run per side | | |
| Pitch factor | | |
| Sloped length per side | | |
| Roof area; squares | | |
| Order with waste; bundles | | |
| Drip edge (ft; pieces) | | |
| Ridge length | | |

## Exit ticket

1. Flat run 20 ft, pitch factor 1.118. Sloped length?

2. 2,400 sq ft of roof plus 10% waste. Squares to order?

3. 27 squares at 3 bundles each?

# Answer key

| Step | Answer |
|---|---|
| Eave | 56 + 2 x 1 = 58 ft |
| Run | 42 / 2 + 1 = 22 ft |
| Factor | square root of (1 + (6/12) squared) = 1.1180 |
| Slope | 22 x 1.1180 = 24.60 ft |
| Area | 2 x 58 x 24.60 = 2,853.2 sq ft = 28.53 squares |
| Order | 28.53 x 1.10 = 31.39, so 32 squares = 96 bundles |
| Drip edge | eaves 2 x 58 + rakes 4 x 24.60 = 214.4 ft = 22 pieces |
| Ridge | 58 ft |

## Exit ticket

1. Flat run 20 ft, pitch factor 1.118. Sloped length?
   **Answer:** 22.36 ft.
2. 2,400 sq ft of roof plus 10% waste. Squares to order?
   **Answer:** 27 (26.4 rounded up).
3. 27 squares at 3 bundles each?
   **Answer:** 81 bundles.

**Scoring:** 1 point each, plus 1 for a complete takeoff. 3 or more = secure.

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