JUNIOR CYCLE MATHS · FREE REVISION SHEET

Area, perimeter & scale drawings

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Learning outcomes (2018 specification): GT.2a, GT.2c. Play the game: **leim.ie/floor-planner.html**

1. Perimeter or area?

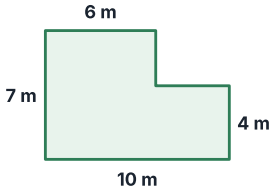
Perimeter = the distance around the edge, in m or cm (fencing, skirting, a frame). **Area** = the space inside, in m² or cm² (flooring, paint, tiles).

Rectangle A = l × w · P = 2(l + w)	**Triangle** A = ½ × base × ⊥ height
Parallelogram A = base × ⊥ height	**Circle** C = 2πr = πd · A = πr²

⊥ height = the **perpendicular** height (at right angles to the base), never the sloping side. The formulas are in the *Formulae and Tables* booklet.

2. L-shapes

Missing sides first: 10 − 6 = 4 m, 7 − 4 = 3 m. **Area** = big rectangle − corner: 70 − 12 = **58 m²**. **Perimeter** = all six sides = **34 m**.



End wall with a pointed roof = rectangle + triangle. Window with a round top = rectangle + semicircle.

3. Circles and π

d = 2r. Area uses the **radius**. Follow the instruction: **π button**, **π = 3.14**, **π = 22/7**, or **in terms of π** (r = 6: area 36π, circumference 12π). Back again: C = 18π → r = 9; A = 49π → r = 7.

Semicircle, d = 6 m: area ½ × π × 3² = **14.1 m²**; perimeter ½ × π × 6 + 6 = **15.4 m** (add the straight edge!). A quarter circle has two straight edges.



Wheels: one turn = one circumference (π × d).

4. Real-life floors

Cost	area × price per m²
Packs, tins, boxes	area ÷ what one covers, then **round UP**
Tiles	same units first: 3 m × 2 m, 50 cm tiles: 6 × 4 = 24
Skirting board	perimeter − the doorway

5. Scale drawings

1 : 50 = 1 cm on the plan is 50 cm in real life. Plan → real **× 50**; real → plan **÷ 50**; then ÷ 100 for m (÷ 100,000 for km). **The scale:** 6 m drawn 3 cm: 600 ÷ 3 → **1 : 200**. **Real area:** change each length first, then multiply (9 cm × 7.2 cm at 1 : 50 = 4.5 m × 3.6 m = 16.2 m²), never plan area × 50.

Classic mistakes: the sloping side as the height · forgetting ½ · the diameter in πr² · no straight edge on a semicircle · m instead of m² · rounding packs down · mixing cm and m.

Exam tip: mark the missing lengths on the diagram, write the formula, put the numbers in, then give the answer WITH units. Round only at the end, the way the question asks.

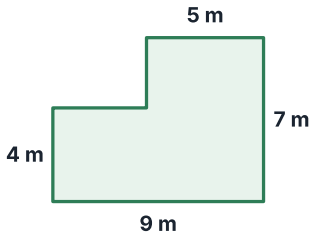
PRACTICE · 34 QUESTIONS

Have a go

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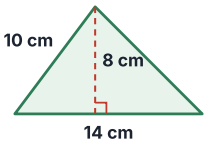
A. Rectangles and L-shapes

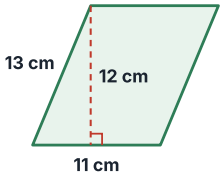
1. A rectangular floor is 7 m by 4.5 m. Find its area. _____
2. Find the perimeter of the floor in question 1. _____
3. A square tile has sides of 6.5 cm. Find its area. _____
4. A rectangle has an area of 48 m² and a length of 8 m. Find its width. _____
5. The L-shaped room on the right: find the lengths of the two sides that are not labelled. _____
6. Find the perimeter of the L-shaped room. _____
7. Find the area of the L-shaped room. _____
8. Flooring costs €22.50 per m². Find the cost of flooring the L-shaped room. _____



B. Triangles and parallelograms

9. Find the area of the triangle on the right. _____
10. Find the area of the parallelogram on the right. _____
11. Find the perimeter of the parallelogram. _____
12. A right-angled triangle has sides 6 cm, 8 cm and 10 cm. The right angle is between the 6 cm and 8 cm sides. Find its area. _____
13. A triangle has an area of 45 cm² and a base of 10 cm. Find its perpendicular height. _____
14. The end wall of a shed is 6 m wide. The walls are 4 m high and the top of the roof is 6.5 m high. Find the area of the end wall. _____
15. A parallelogram has an area of 72 cm² and a base of 9 cm. Find its perpendicular height. _____





C. Circles

16. A circle has a radius of 5 cm. Find its circumference (π button, 1 decimal place). _____
17. Find the area of the circle in question 16 (π button, 1 decimal place). _____
18. A circle has a diameter of 14 cm. Using π = 22/7, find its circumference. _____
19. Using π = 22/7, find the area of the circle in question 18. _____
20. A circle has a radius of 9 cm. Find its area in terms of π. _____
21. A circle has a circumference of 20π cm. Find its radius. _____
22. A semicircle has a diameter of 10 m. Find its perimeter (π button, 1 decimal place). _____
23. A wheel with a diameter of 70 cm turns 200 times. Using π = 22/7, how far does it travel, in metres? _____

D. Scale drawings and maps

24. A plan has a scale of 1 : 50. A wall is 8.4 cm long on the plan. How long is the real wall, in metres? _____
25. A plan has a scale of 1 : 100. A real wall is 6.5 m long. How long is it on the plan? _____
26. A wall 7.5 m long is drawn 3 cm long on a plan. What is the scale? _____
27. On a plan with scale 1 : 50, a room is 8 cm by 6 cm. Find the real area of the room in m². _____
28. A map has a scale of 1 : 25,000. Two farms are 8 cm apart on the map. How far apart are they, in km? _____
29. A map has a scale of 1 : 50,000. A walk is 6 km long. How long is it on the map? _____
30. On a plan, 1 cm represents 2.5 m. A hall is 4.8 cm long on the plan. How long is the real hall? _____

Questions 31–34 are on the next page.

EXAM-STYLE · THEN CHECK

Exam corner + answers

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E. Exam-style questions (show your work)

31. **The back garden.** A rectangular lawn is 12 m by 8 m. A round pond with a radius of 1.5 m is dug in the middle of it. (a) Find the area of grass left, to 1 decimal place. (b) A box of lawn feed covers 20 m². How many boxes are needed for the grass? (c) A fence goes around the edge of the lawn except for a gate 1.2 m wide. How long is the fence?

32. **The running track.** A track has two straights 85 m long and a semicircle at each end. The semicircles have a diameter of 64 m. (a) Find the length of one lap of the inside edge, to the nearest metre. (b) Find the area inside the track, to the nearest m². (c) How many complete laps must a runner do to run at least 5 km?

33. **The kitchen plan.** Ella draws her kitchen to a scale of 1 : 20. The table is 9 cm by 4.5 cm on the plan. (a) Find the real length and width of the table. (b) Find the real area of the table top. (c) A round table with a diameter of 1.2 m is drawn on the same plan. What is its diameter on the plan? (d) Find the area of the round table top in terms of π.

34. **Same base, same area.** A triangle and a parallelogram both have a base of 10 cm and an area of 40 cm². (a) Find the perpendicular height of each. (b) Ciara draws a triangle with a base of 10 cm and a sloping side of 8 cm. She says its area is ½ × 10 × 8 = 40 cm². Explain her mistake.

Answers

A	1. 31.5 m² · 2. 23 m · 3. 42.25 cm² · 4. 6 m · 5. 4 m and 3 m · 6. 32 m · 7. 51 m² · 8. €1,147.50
B	9. 56 cm² · 10. 132 cm² · 11. 48 cm · 12. 24 cm² · 13. 9 cm · 14. 31.5 m² · 15. 8 cm
C	16. 31.4 cm · 17. 78.5 cm² · 18. 44 cm · 19. 154 cm² · 20. 81π cm² · 21. 10 cm · 22. 25.7 m · 23. 440 m
D	24. 4.2 m · 25. 6.5 cm · 26. 1 : 250 · 27. 12 m² · 28. 2 km · 29. 12 cm · 30. 12 m
E	31. (a) 96 − π × 1.5² = **88.9 m²** (b) 88.93 ÷ 20 = 4.45 → **5 boxes** (c) 40 − 1.2 = **38.8 m** · 32. (a) 170 + 64π = **371 m** (b) 85 × 64 + π × 32² = **8,657 m²** (c) 5,000 ÷ 371.06 = 13.47 → **14 laps** · 33. (a) **1.8 m** by **0.9 m** (b) **1.62 m²** (c) 120 ÷ 20 = **6 cm** (d) π × 0.6² = **0.36π m²** · 34. (a) triangle **8 cm**, parallelogram **4 cm** (b) 8 cm is the sloping side, not the perpendicular height. The height is shorter than 8 cm, so the area is less than 40 cm²

Got one wrong? Check: did you use the perpendicular height, and the radius (not the diameter) in πr²? Did you add the straight edge of a semicircle? Did you change every length to real life before working out an area from a plan? Then play **Floor Planner** at leim.ie/floor-planner.html: the "Go back over these" list at the end shows the rule for each mistake.

All questions written by Léim. Léim is independent and not connected with the State Examinations Commission or the NCCA.