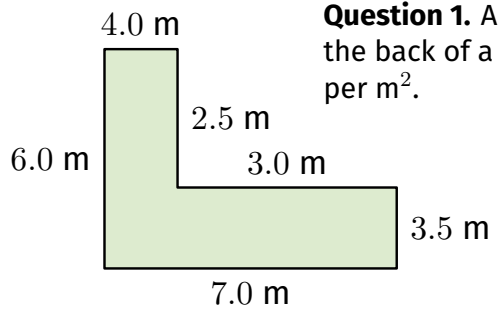
An L-Shaped Deck

Split the deck into the two rectangles shown by the dashed line, then answer parts (a)-(d) in order.



Question 1. A new L-shaped deck is being built at the back of a house. Composite decking costs \$86 per m^2.

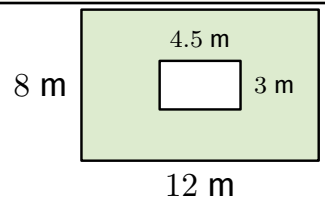
(a) Calculate the area of the bottom rectangle (bottom width $\times$ right height).
Solution $7.0 \times 3.5 = 24.5$ m^2.

(b) Calculate the area of the top-left rectangle (top width $\times$ inner drop).
Solution $4.0 \times 2.5 = 10.0$ m^2.

(c) Calculate the total area of the deck.

Turfing a Lawn

The garden bed is not turfed – its area must be subtracted from the lawn's area.



Question 2. A rectangular lawn measures 12 m by 8 m. A rectangular garden bed measuring 4.5 m by 3 m sits inside the lawn and will not be turfed. New turf costs \$18 per m^2, and can only be bought in whole square metres.

(a) Calculate the area of the whole rectangular lawn.
Solution $12 \times 8 = 96$ m^2.

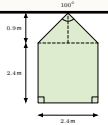
(b) Calculate the area of the garden bed that will not be turfed.
Solution $4.5 \times 3 = 13.5$ m^2.

(c) Calculate the area of lawn that needs new turf.
Solution $96 - 13.5 = 82.5$ m^2.

(d) Turf can only be bought in whole square metres. How many square metres must be bought, and what is the total cost?
Solution 82.5 rounds UP to 83 m^2. Cost $= 83 \times \$18 = \$1494.00$.

Painting a Shed Wall

The wall is a square with a triangular gable above it – find each area, then add them.



Question 3. A garden shed's front wall is a 2.4 m square with a triangular gable roof section 0.9 m tall above it. The wall needs 2 coats of paint, and one tin covers 6 m^2 per coat.

(a) Calculate the area of the square section and the triangular gable section.
Solution Square: $2.4 \times 2.4 = 5.76$ m^2. Gable: $\frac{1}{2} \times 2.4 \times 0.9 = 1.08$ m^2.

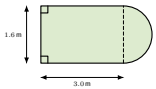
(b) Calculate the total wall area to be painted.
Solution $5.76 + 1.08 = 6.84$ m^2.

(c) Calculate the total area of paint coverage needed for 2 coats, then find how many tins are needed (only whole tins can be bought).
Solution $6.84 \times 2 = 13.68$ m^2 of coverage. $13.68 \div 6 = 2.28$, round UP $= 3$ tins.

(d) Each tin costs \$45. Find the total cost of the paint.
Solution $3 \times \$45 = \$135.00$.

A Running-Track Garden Bed

The garden bed is a rectangle with a semicircular end – add the two areas for the total.



Question 4. A garden bed shaped like a running track (a rectangle with a semicircular end) has a straight section 3.0 m long and 1.6 m wide (the semicircular end has the same 1.6 m diameter). Soil costs \$22 per m^2, and edging strip is sold in 1 m lengths at \$9 each.

(a) Calculate the area of each section, then the total area.
Solution Rectangle 4.8 m^2, semicircle ≈ 1.01 m^2. Total ≈ 5.81 m^2.

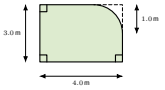
(b) Calculate the cost of the soil.
Solution $5.8053\ldots \times \$22 \approx \$127.72$.

(c) Calculate the perimeter of the garden bed, correct to 2 decimal places.
Solution $P = 2(3.0) + 1.6 + \pi(0.8) \approx 10.11$ m.

(d) How many 1 m lengths of edging are needed, and what is the total cost?
Solution $10.1133\ldots \div 1$, round UP $= 11$ lengths. Cost $= 11 \times \$9 = \$99.00$.

A Rounded-Corner Deck

Read the scenario, then answer parts (a)-(d) in order.



Question 5. A rectangular deck measuring 4.0 m by 3.0 m has one corner rounded off with a radius of 1.0 m for safety. Composite decking costs \$92 per m^2, and edge trim costs \$11 per metre (sold continuously).

(a) Calculate the area of the decking needed (the rectangle's area, minus the missing corner square, plus the quarter-circle that replaces it).

Solution $A = (4.0)(3.0) - (1.0)^2 + \frac{1}{4}\pi(1.0)^2 \approx 11.79$ m^2.

(b) Calculate the total cost of the decking.

Solution $11.7854\ldots \times \$92 \approx \$1084.26$.

(c) Calculate the perimeter of the deck (the straight edges plus the quarter-circle arc), correct to 2 decimal places.

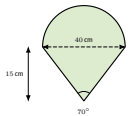
Solution $P = 2(4.0 + 3.0) - 2(1.0) + \frac{1}{2}\pi(1.0) \approx 13.57$ m.

(d) Calculate the cost of the edge trim.

Solution $13.5708\ldots \times \$11 \approx \$149.28$.

Plant Marker Signs

Find the area of one sign in cm^2 first, then convert to m^2 before pricing.



Question 6. A school garden orders 25 identical plant-marker signs, each shaped like a semicircle with a triangular point (a semicircular top on a triangular base). Each sign has a 40 cm diameter and a 15 cm triangular point depth. Acrylic material costs \$45 per m^2.

(a) Calculate the area of the semicircular section and the triangular point of one sign, in cm^2.

Solution Semicircle (radius 20 cm): $\frac{1}{2}\pi(20)^2 \approx 628.32$ cm^2. Triangle: $\frac{1}{2}\times 40\times 15 = 300$ cm^2. Total ≈ 928.32 cm^2.

(b) Convert the area of one sign to m^2 (divide by $10\,000$), then find the total area needed for 25 signs.

Solution $928.32 \div 10\,000 \approx 0.0928$ m^2 per sign. $25 \times 0.092832\ldots \approx 2.32$ m^2.

(c) Calculate the total cost of the acrylic.

Solution $2.3208\ldots \times \$45 \approx \$104.44$.