

Measurement applications: compound shapes – Answers



Split compound shapes into simpler parts (or subtract an excluded region) to solve real-world area, perimeter, and cost problems.

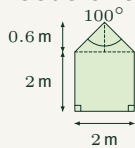
Name _____

Date _____

How to answer

Split every compound shape into simpler shapes first (or identify the excluded region to subtract). Convert units where needed, show every step of your working, and give money answers to the nearest cent. Where a purchase must be made in whole items (tins, boxes, bags, rolls), round UP even if the exact amount is only a little over a whole number.

Worked example A garden shed's front wall is a 2 m square with a triangular gable roof section 0.6 m tall. It needs one coat of primer, covering 4 m^2 per tin, at \$32 per tin.



Square area $= 2 \times 2 = 4 \text{ m}^2$. Gable area $= \frac{1}{2} \times 2 \times 0.6 = 0.6 \text{ m}^2$. Total $= 4.6 \text{ m}^2$.

Tins needed $= 4.6 \div 4 = 1.15$, and only whole tins can be bought, so round UP $= 2$ tins.

Total cost $= 2 \times \$32 = \64.00 .

Measurement applications: compound shapes – Answers

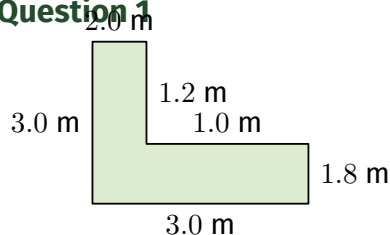


Question 1: L-shaped bathroom tiling. Question 2: rounded-corner garden path.

Name _____

Date _____

Question 1



An L-shaped bathroom floor has these dimensions: left height 3.0 m, top width 2.0 m, inner drop 1.2 m, inner horizontal 1.0 m, right height 1.8 m, bottom width 3.0 m. Tile boxes cover 1.5 m^2 each and cost \$42, sold only as whole boxes.

(a) Calculate the total floor area of the bathroom.

Solution

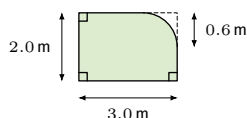
$$3.0 \times 1.8 = 5.4 \text{ m}^2; 2.0 \times 1.2 = 2.4 \text{ m}^2. \text{ Total} = 7.8 \text{ m}^2.$$

(b) How many boxes of tiles are needed, and what is the total cost?

Solution

$$7.8 \div 1.5 = 5.2, \text{ round UP} = 6 \text{ boxes. Cost} = 6 \times \$42 = \$252.00.$$

Question 2



A garden path is a rectangle 3.0 m by 2.0 m with one corner rounded off with a 0.6 m radius. Paving costs \$60 per m^2 , plus a flat \$35 delivery fee.

(a) Calculate the area of the path, correct to 2 decimal places.

Solution

$$A = (3.0)(2.0) - (0.6)^2 + \frac{1}{4}\pi(0.6)^2 \approx 5.92 \text{ m}^2.$$

(b) Calculate the cost of the paving, then add the delivery fee for the total cost.

Solution

$$5.9227 \dots \times \$60 \approx \$355.36. \text{ Total} = \$355.36 + \$35 = \$390.36.$$

Measurement applications: compound shapes – Answers

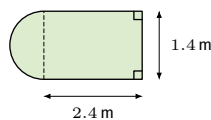


Question 3: running-track garden bed. Question 4: plant-marker signs.

Name _____

Date _____

Question 3



A garden bed shaped like a running track (a rectangle with a semicircular end) has a straight section 2.4 m long and 1.4 m wide. Soil bags cover 0.5 m^2 each and cost \$8.20, sold only as whole bags.

(a) Calculate the area of the garden bed, correct to 2 decimal places.

Solution

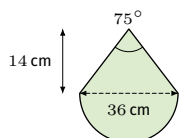
Rectangle 3.36 m^2 ; semicircle $\approx 0.77 \text{ m}^2$. Total $\approx 4.13 \text{ m}^2$.

(b) How many bags of soil are needed, and what is the total cost?

Solution

$4.1297 \dots \div 0.5 \approx 8.26$, round UP = 9 bags. Cost = $9 \times \$8.20 = \73.80 .

Question 4



A school orders 40 identical plant-marker signs, each a semicircle with a triangular point: diameter 36 cm, triangular point depth 14 cm. Acrylic material costs \$38 per m^2 .

(a) Calculate the area of one sign, in cm^2 .

Solution

Semicircle (radius 18 cm) $\approx 508.94 \text{ cm}^2$; triangle = 252 cm^2 . Total $\approx 760.94 \text{ cm}^2$.

(b) Convert to m^2 , find the total area for 40 signs, then the total cost.

Solution

$760.94 \div 10\,000 \approx 0.0761 \text{ m}^2$. $40 \times 0.076094 \dots \approx 3.04 \text{ m}^2$. Cost $\approx 3.043752 \dots \times \$38 \approx \$115.66$.

Measurement applications: compound shapes – Answers

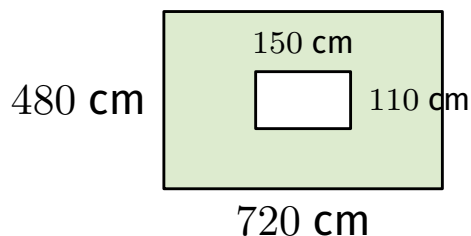


Question 5: carpeting a room with a stairwell void.

Name _____

Date _____

Question 5



A room measures 720 cm by 480 cm. A stairwell void measuring 150 cm by 110 cm sits inside and is not carpeted. Carpet and underlay together cost \$33 per m², sold only in whole square metres, plus a flat \$180 installation fee.

(a) Convert all dimensions to metres, then calculate the area of carpet needed (room area minus the void).

Solution

$7.2 \times 4.8 = 34.56 \text{ m}^2$; void $1.5 \times 1.1 = 1.65 \text{ m}^2$. Area = 32.91 m^2 .

(b) Carpet is sold only in whole square metres. How many square metres must be bought?

Solution

32.91 rounds UP to 33 m².

(c) Calculate the cost of the carpet and underlay, based on the whole square metres bought.

Solution

$33 \times \$33 = \1089.00 .

(d) Installation costs a flat \$180. Find the total cost of the project.

Solution

$\$1089.00 + \$180 = \$1269.00$.

Measurement applications: compound shapes – Answers

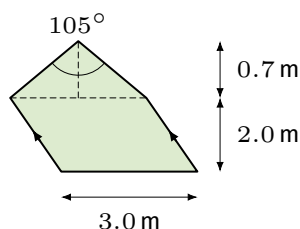


Question 6: cladding a carport wall – comparing two suppliers.

Name _____

Date _____

Question 6



A carport's side wall is a parallelogram 3.0 m wide and 2.0 m tall, with a triangular gable 0.7 m tall above it. **Supplier P:** \$70 per m², free delivery on orders of \$500 or more (otherwise a \$45 delivery fee). **Supplier Q:** \$75 per m², no delivery fee ever. Budget: \$550.

(a) Calculate the total area of the wall (parallelogram section plus triangular gable).

Solution

Parallelogram $3.0 \times 2.0 = 6.0 \text{ m}^2$; gable $\frac{1}{2} \times 3.0 \times 0.7 = 1.05 \text{ m}^2$. Total = 7.05 m^2 .

(b) Calculate the cost from Supplier P, including delivery if it applies.

Solution

$7.05 \times \$70 = \493.50 ; this is under \$500, so the \$45 delivery fee applies. Total = $\$493.50 + \$45 = \$538.50$.

(c) Calculate the cost from Supplier Q.

Solution

$7.05 \times \$75 = \528.75 .

(d) With a \$550 budget, which supplier should be used? Justify your decision using the actual costs.

Solution

Both fit the budget. Supplier Q is cheaper (\$528.75 vs \$538.50, a \$9.75 saving), even though its rate per m² is higher, because Supplier P's order falls just short of the free-delivery threshold.