

Measurement applications: simple shapes – Solutions



Solve real-world perimeter, area, and cost problems for rectangles, triangles, parallelograms, trapezia, and circles.

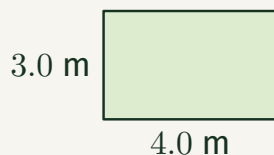
Name _____

Date _____

How to answer

Read each scenario carefully. 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, rolls, sheets, packs), round UP even if the exact amount is only a little over a whole number.

Worked example A rectangular patio measures 4.0 m by 3.0 m and needs a protective sealant. One tin of sealant covers 5 m² and costs \$38.



$$\text{Area} = 4.0 \times 3.0 = 12 \text{ m}^2.$$

Tins needed = $12 \div 5 = 2.4$, and only whole tins can be bought, so round UP = 3 tins.

$$\text{Total cost} = 3 \times \$38 = \$114.00.$$

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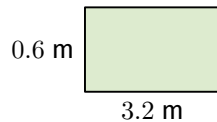


Question 1: tiling. Question 2: skate park edging.

Name _____

Date _____

Question 1



A kitchen splashback measures 3.2 m by 0.6 m and needs tiling. Tiles are sold in boxes that each cover 1 m^2 , at \$34.50 per box.

(a) Calculate the area of the splashback.

Solution

$$\text{Area} = 3.2 \times 0.6 = 1.92 \text{ m}^2.$$

(b) Only whole boxes of tiles can be bought. How many boxes are needed?

Solution

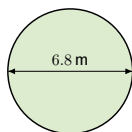
$$1.92 \div 1 = 1.92, \text{ round UP} = 2 \text{ boxes.}$$

(c) Calculate the total cost of the tiles.

Solution

$$2 \times \$34.50 = \$69.00.$$

Question 2



A circular skate park bowl has a diameter of 6.8 m. Edging piping is sold in 2 m lengths at \$28 each, and only whole lengths can be bought.

(a) Calculate the circumference of the bowl, correct to 2 decimal places.

Solution

$$C = \pi \times 6.8 \approx 21.36 \text{ m.}$$

(b) Determine how many 2 m lengths of piping are needed, and the total cost.

Solution

$$21.362 \dots \div 2 \approx 10.68, \text{ round UP} = 11 \text{ lengths. Cost} = 11 \times \$28 = \$308.00.$$

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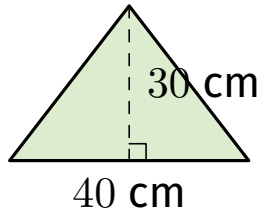


Question 3: bunting fabric.

Name _____

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Question 3



Bunting for a school fair is made from 15 identical triangular flags. Each flag has a base of 40 cm and a height of 30 cm. Fabric costs \$12 per m².

(a) Convert the base and height of one flag to metres.

Solution

$$40 \text{ cm} = 0.4 \text{ m}; 30 \text{ cm} = 0.3 \text{ m}.$$

(b) Calculate the area of fabric needed for one flag.

Solution

$$\text{Area} = \frac{1}{2} \times 0.4 \times 0.3 = 0.06 \text{ m}^2.$$

(c) Calculate the total area of fabric needed for all 15 flags.

Solution

$$15 \times 0.06 = 0.9 \text{ m}^2.$$

(d) Calculate the total cost of the fabric.

Solution

$$0.9 \times \$12 = \$10.80.$$

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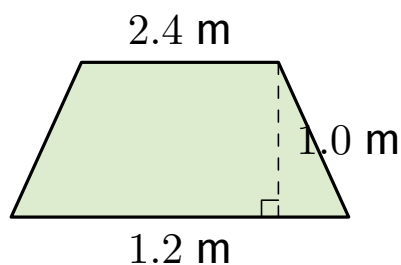


Question 4: building a raised garden bed.

Name _____

Date _____

Question 4



A trapezium-shaped raised garden bed has parallel sides of 2.4 m and 1.2 m, two equal 1.3 m sloped sides, and a perpendicular height of 1.0 m between the parallel sides. Timber edging costs \$19 per metre, and soil costs \$9.90 per bag, where each bag covers 0.3 m^2 of bed.

(a) Calculate the perimeter of the bed, and the cost of the timber edging.

Solution

$$P = 2.4 + 1.2 + 1.3 + 1.3 = 6.2 \text{ m. Cost} = 6.2 \times \$19 = \$117.80.$$

(b) Calculate the area of the bed. Only whole bags of soil can be bought – how many bags are needed, and what is the soil cost?

Solution

$$A = \frac{1}{2}(2.4 + 1.2)(1.0) = 1.8 \text{ m}^2. \text{ Bags} = 1.8 \div 0.3 = 6 \text{ (exact)} = 6 \text{ bags. Cost} = 6 \times \$9.90 = \$59.40.$$

(c) Find the total cost of the project.

Solution

$$\$117.80 + \$59.40 = \$177.20.$$

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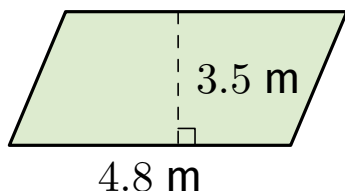


Question 5: comparing two paving quotes.

Name _____

Date _____

Question 5



A homeowner is choosing between two parallelogram-shaped paving quotes for the same courtyard section. **Quote A:** base 4.8 m, height 3.5 m, \$65 per m^2 , with free delivery on orders of \$1500 or more (otherwise a \$95 delivery fee). **Quote B:** base 5.0 m, height 3.2 m, \$95 per m^2 , with the same free-delivery rule.

(a) Calculate the area and the paving cost (before delivery) for each quote.

Solution

A: $4.8 \times 3.5 = 16.8 \text{ m}^2$; cost = $16.8 \times \$65 = \1092.00 . B: $5.0 \times 3.2 = 16.0 \text{ m}^2$; cost = $16.0 \times \$95 = \1520.00 .

(b) Decide whether each quote qualifies for free delivery, then find the total cost of each.

Solution

A: $\$1092.00 < \1500 , so the \$95 fee applies; total = $\$1092.00 + \$95 = \$1187.00$. B: $\$1520.00 \geq \1500 , so delivery is free; total = $\$1520.00$.

(c) Which quote should the homeowner accept? Justify your decision.

Solution

Quote A: it totals \$333.00 less (\$1187.00 vs \$1520.00), even though Quote B's order value alone clears the free-delivery threshold.

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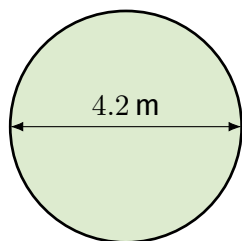


Question 6: trampoline on a budget.

Name _____

Date _____

Question 6



A family is choosing a trampoline within a \$900 budget. **Round option:** diameter 4.2 m, \$749, plus safety matting at \$19 per m^2 of footprint. **Rectangular option:** 3.6 m by 2.2 m, \$699, plus the same \$19 per m^2 matting.

(a) Calculate the area and total cost (trampoline plus matting) for each option.

Solution

Round: $A = \pi(2.1)^2 \approx 13.85 \text{ m}^2$; matting $\approx \$263.23$; total $\approx \$749 + \$263.23 = \$1012.23$. Rectangular: $A = 3.6 \times 2.2 = 7.92 \text{ m}^2$; matting = \$150.48; total = \$699 + \$150.48 = \$849.48.

(b) With a \$900 budget, which option(s) can the family afford?

Solution

Only the rectangular option ($\$849.48 \leq \900); the round option is over budget ($\$1012.23 > \900).

(c) Which option should the family choose? Justify your decision, including any trade-off between budget and value for money.

Solution

The rectangular option, since it is the only one the family can afford. This is a trade-off: the round option is actually better value ($\$1012.23 \div 13.85 \approx \73 per m^2) than the rectangular option ($\$849.48 \div 7.92 \approx \107 per m^2), but it does not fit the budget, so the family must accept the less space-efficient option.