

Integrated Measurement Projects



Key idea

One diagram can generate different quantities. Match each cost to the measurement it uses.

Units tell you what to find

Length: m Area: m^2
Volume: m^3 Rate: \$/unit

Read the model



Rectangle + triangle form the cross-section. The shape is extruded through a constant depth.

Common mistake

Do not use the total area for a finish that covers only one region.

Build the Measurements



Key idea

Calculate reusable measurements before applying prices. Keep each value labelled.

Cross-sectional area

Rectangle: $6(1.2) = 7.2 \text{ m}^2$
Triangle: $\frac{1}{2}(6)(2.5) = 7.5 \text{ m}^2$
Total: 14.7 m^2

Slope and volume

$$s = \sqrt{6^2 + 2.5^2} = 6.5 \text{ m}$$
$$V = 14.7(5) = 73.5 \text{ m}^3$$

Quantity table

Record: quantity, value, unit, rate and cost. This makes the final quote traceable.

 = **copy this into your book.** Boxes without a pencil are just to read.

Turn Measurements into Costs



Key idea

cost = measured quantity $\times$
unit rate + fixed fee

Component costs

Sponsor: $7.2(125) + 650 = \$1550$
Art: $7.5(62.50) = \$468.75$

Length and volume costs

Lights: $(6 + 6.5)(77.50) = \$968.75$
Concrete: $73.5(220) = \$16\,170$

Common mistake

Apply an allowance before pricing. Round whole packs or loads up; round money at the end.

 = **copy this into your book.** Boxes without a pencil are just to read.

Decide and Evaluate



Key idea

A recommendation needs calculated evidence: compare complete totals, then state the difference.

Complete quote

$$1550 + 468.75 + 968.75 + 16\,170 =$$

\$19 157.50

Test the model

Is depth constant? Are one or both sides finished? Are delivery, labour, tax and wastage included?

Common mistake

A limitation is not just “not to scale”. Explain what was simplified and how it could change the quote.



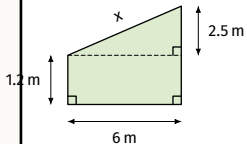
= copy this into your book. Boxes without a pencil are just to read.

Skate Course Quote



Use the shared diagram throughout. Show each measurement, apply the stated rates, and give a traceable final decision.

The diagram is one visible side of a course, extruded to a constant depth of 5 m. The rectangle carries sponsorship; the triangle carries street art. Lights follow the 6 m ground run and the sloping edge.



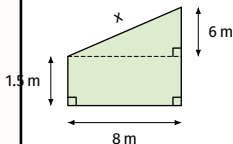
- (a)** Find the rectangular and triangular areas, then the total cross-sectional area.
- (b)** Sponsorship costs $\$125/\text{m}^2$ plus $\$650$ installation. Find its cost.
- (c)** Street art costs $\$62.50/\text{m}^2$. Find its cost.
- (d)** The sloping edge is 6.5 m. Lights cost $\$77.50/\text{m}$. Find the lighting cost.
- (e)** Concrete costs $\$220/\text{m}^3$. Find the volume, concrete cost, and total project cost.

Training Ramp Upgrade



Use the shared diagram throughout. Show each measurement, apply the stated rates, and give a traceable final decision.

One visible side has an 8 m base, a 1.5 m rectangular platform and a 6 m rise. The course depth is 4 m.



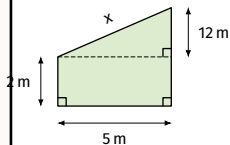
- (a)** Find the two component areas and total cross-sectional area.
- (b)** Branding covers the rectangle at $\$110/\text{m}^2$ plus $\$500$ setup; artwork covers the triangle at $\$70/\text{m}^2$.
- (c)** The sloping edge is 10 m. Lights follow it and the base at $\$65/\text{m}$.
- (d)** Concrete costs $\$205/\text{m}^3$. Find its volume and cost.
- (e)** Find the complete project cost.

Competition Launch Ramp



Use the shared diagram throughout. Show each measurement, apply the stated rates, and give a traceable final decision.

The profile has a 5 m base, 2 m platform height and 12 m rise. It is extruded 3.5 m.

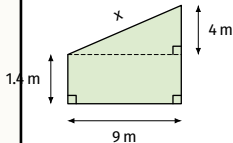


- (a)** Find the cross-sectional area.
- (b)** Logos cost $\$140/\text{m}^2$ on the rectangle plus $\$600$ setup; art costs $\$55/\text{m}^2$ on the triangle.
- (c)** Use Pythagoras to find the slope, then price lights along the slope and base at $\$80/\text{m}$.
- (d)** Concrete is $\$230/\text{m}^3$. Find the volume and cost.
- (e)** Find the total.

Indoor Skills Course

Use the shared diagram throughout. Show each measurement, apply the stated rates, and give a traceable final decision.

The profile is 9 m wide with a 1.4 m platform and 4 m rise; depth is 4.5 m. Only the visible side is decorated.



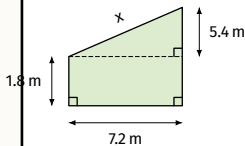
- (a)** Calculate the rectangle, triangle and total cross-sectional areas.
- (b)** Allow 8% artwork wastage on the triangular area. Art costs \$68/m².
- (c)** Branding on the rectangle is \$118/m² plus \$720.
- (d)** Find the slope using Pythagoras. Lights follow the base and slope at \$74/m.
- (e)** Concrete is \$215/m³. Find the total project cost.

Community Skate Feature



Use the shared diagram throughout. Show each measurement, apply the stated rates, and give a traceable final decision.

The profile is 7.2 m wide, with a 1.8 m platform and 5.4 m rise; depth = 3.8 m.



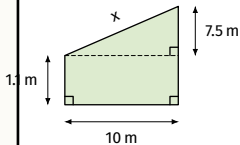
- (a)** Find the visible rectangle and triangle areas.
- (b)** A sponsor pays \$145/m² for the rectangle, less a 6% discount, plus \$540 installation. Find the charge.
- (c)** Art costs \$64/m² and lights along base and slope cost \$79/m.
- (d)** Concrete costs \$225/m³. Find volume and cost.
- (e)** Find the overall cost.

Warehouse Obstacle



Use the shared diagram throughout. Show each measurement, apply the stated rates, and give a traceable final decision.

The profile is 10 m wide with a 1.1 m platform and 7.5 m rise; its depth is 5.2 m.



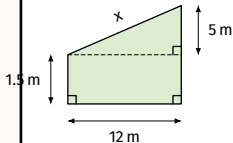
- (a)** Find the cross-sectional area and concrete volume.
- (b)** Concrete is sold in 6 m^3 truckloads at \$1320 per load. Find the number and cost.
- (c)** Visible-side finishes cost $\$130/\text{m}^2$ on the rectangle and $\$60/\text{m}^2$ on the triangle, plus one \$800 setup fee.
- (d)** Lights follow the base and slope at $\$72/\text{m}$.
- (e)** Find the total and explain why truck rounding matters.

Supplier Decision



Use the shared diagram throughout. Show each measurement, apply the stated rates, and give a traceable final decision.

The profile is 12 m wide, with a 1.5 m platform, 5 m rise and 4 m depth.



(a) Find its cross-sectional area, slope length and volume.

(b) Finish costs are $\$120/\text{m}^2$ on the rectangle plus $\$650$, and $\$66/\text{m}^2$ on the triangle. Lights cover base plus slope at $\$75/\text{m}$.

(c) Supplier A charges $\$218/\text{m}^3$. Supplier B charges $\$205/\text{m}^3$ plus $\$3100$ delivery. Which gives the lower total project cost?

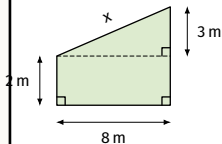
(d) State two assumptions that could materially affect the quote.

Budget Risk



Use the shared diagram throughout. Show each measurement, apply the stated rates, and give a traceable final decision.

The profile is 8 m wide with a 2 m platform, 3 m rise and 6 m depth. The project budget is \$45 000.



(a) Find area, slope, and volume.

(b) Finish the visible side: rectangle \$135/m² plus \$500; triangle \$72/m²; lights along base and slope \$82/m.

(c) Concrete is quoted at \$232/m³ with a 5% wastage allowance. Is the project within budget?

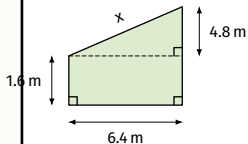
(d) Explain why using rounded intermediate values could change a borderline decision.

Camera-Side Limitation



Use the shared diagram throughout. Show each measurement, apply the stated rates, and give a traceable final decision.

The course has a 6.4 m base, 1.6 m platform, 4.8 m rise and 5 m depth. The quoted art and logos cover only the camera-facing side.



(a) Calculate the visible areas, slope and concrete volume.

(b) Logos cost $\$128/\text{m}^2$ plus $\$625$; art $\$69/\text{m}^2$; lighting along base and slope $\$76/\text{m}$; concrete $\$224/\text{m}^3$. Find the quote.

(c) The client later asks for both sides to receive logos and art, but lighting remains on one side. Find the revised total.

(d) Identify the original model limitation revealed by this change.

Integrated measurement projects

Coordinate area, length, volume, rates and decisions from one model.



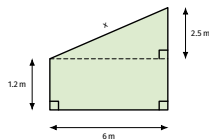
Name _____

Date _____

Project method

For each project, use the labelled cross-section throughout. Keep full precision until the final money answer; show units and justify decisions.

Project A



Depth 5 m. Rectangle finish $\$125/\text{m}^2 + \650 ; triangle art $\$62.50/\text{m}^2$; lights on base+slope $\$77.50/\text{m}$; concrete $\$220/\text{m}^3$.

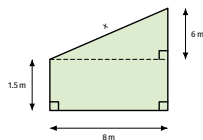
1. Find rectangle, triangle and total areas.

2. Find the slope and volume.

3. Find the complete quote.

Questions 1–3

Project B



Depth 4 m. Rectangle branding $\$110/\text{m}^2 + \500 ; triangle art $\$70/\text{m}^2$; lights $\$65/\text{m}$; concrete $\$205/\text{m}^3$.

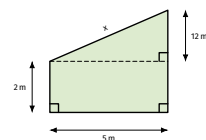
4. Find all areas.

5. Find slope and volume.

6. Find the complete quote.

Questions 4–6

Project C



Depth 3.5 m. Rectangle logos $\$140/\text{m}^2 + \600 ; triangle art $\$55/\text{m}^2$; lights $\$80/\text{m}$; concrete $\$230/\text{m}^3$.

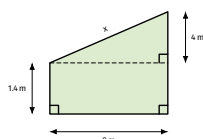
7. Find all areas.

8. Find slope and volume.

9. Find the complete quote.

Questions 7–9

Project D



Depth 4.5 m. Triangle art has 8% wastage at $\$68/\text{m}^2$; rectangle branding $\$118/\text{m}^2 + \720 ; lights $\$74/\text{m}$; concrete $\$215/\text{m}^3$.

10. Find all areas.

11. Find slope and volume.

12. Find the complete quote.

Questions 10–12

Integrated measurement projects

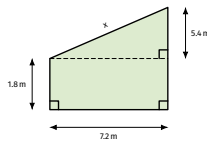
Compare options, respect purchase rules, and test assumptions.



Name _____

Date _____

Project E



Depth 3.8 m. Rectangle branding \$145/m², less 6%, + \$540; art \$64/m²; lights \$79/m; concrete \$225/m³.

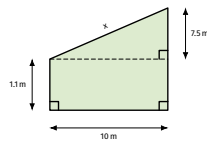
Questions 13–15

13. Find all areas.

14. Find slope and volume.

15. Find the complete quote.

Project F



Depth 5.2 m. Concrete: 6 m³ loads at \$1320. Finishes: rectangle \$130/m², triangle \$60/m², + \$800. Lights \$72/m.

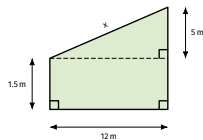
Questions 16–18

16. Find area, slope and volume.

17. Find loads and concrete cost.

18. Find total; explain the rounding.

Project G



Depth 4 m. Other costs: rectangle \$120/m² + \$650; triangle \$66/m²; lights \$75/m. Concrete A \$218/m³; B \$205/m³ + \$3100.

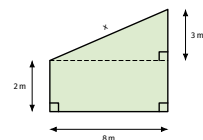
Questions 19–21

19. Find area, slope and volume.

20. Find both complete totals.

21. Recommend; state the difference.

Project H



Depth 6 m; budget \$45 000. Finishes: rectangle \$135/m² + \$500; triangle \$72/m²; lights \$82/m. Concrete \$232/m³ with 5% wastage.

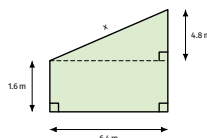
Questions 22–24

22. Find area, slope and volume.

23. Find the complete quote.

24. Decide against budget; explain precision.

Project I



Depth 5 m. Logos \$128/m² + one \$625 fee; art \$69/m²; lights \$76/m; concrete \$224/m³. Initial quote finishes one side.

Questions 25–27

25. Find areas, slope and volume.

26. Find the one-side quote.

27. Revise for two finished sides; name the limitation.