GRADE 7 · UNIT 4 · LESSON 4

Finding the Area of Composite Figures

MA.7.GR.1.2

I can find the area of a figure made of several shapes, by cutting it apart or by boxing it in.

Warm-Up

1. A rectangle: 12 m long, 5 m wide. What is its area?
2. A triangle: base 12 m, height 4 m. What is its area?
3. That triangle is a roof on that rectangle. Whole area?
4. No formula for the whole. Why did adding the areas work?

Warm-Up

1. A rectangle: 12 m long, 5 m wide. What is its area? **60 m^2**
2. A triangle: base 12 m, height 4 m. What is its area? **24 m^2**
3. That triangle is a roof on that rectangle. Whole area?

   84 m^2

4. No formula for the whole. Why did adding the areas work?

   No gaps, and nothing counted twice.

Vocabulary

composite figure

a figure made of two or more shapes you already know

decompose

to cut a figure into shapes you already know how to measure

dimension

a length printed on a figure

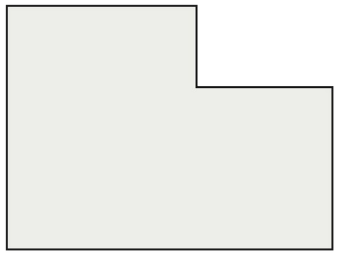
Notes

I. What a composite figure is

composite figure — a figure made of two or more shapes you already know

There is no formula for the whole shape, and there does not need to be.

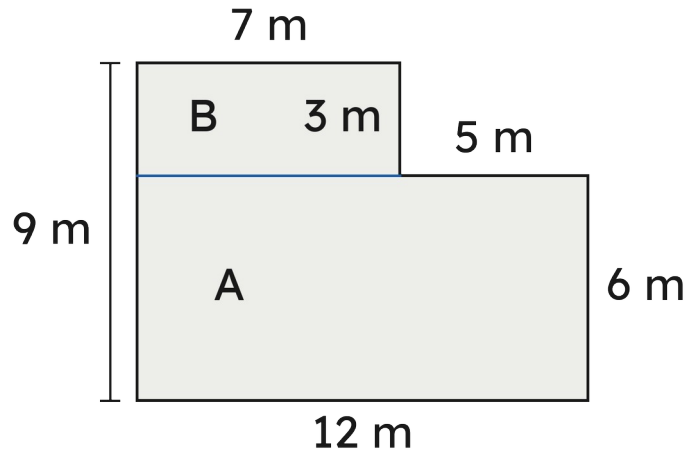
Find the shapes you know inside it. Deal with them one at a time.



Notes

II. Cut it apart and add

Draw straight cuts until every piece is a rectangle or a triangle.



Notes

Cut it apart: every length belongs to one piece

Find the area of each piece. Then add.

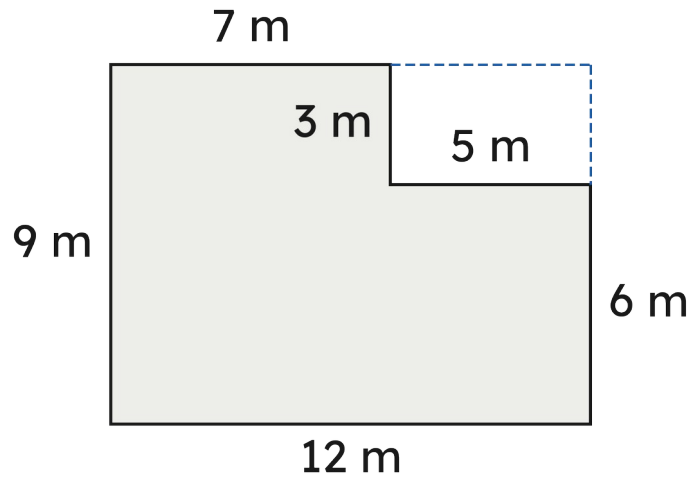
Every length belongs to one piece. A length across the whole figure is not the length of a piece.

The pieces must cover the figure with no gaps and no overlap.

Notes

III. Box it in and subtract

If the figure is a rectangle with a bite taken out of it, draw the whole rectangle.



Notes

Box it in: box – bite

Find the area of the whole box. Find the area of the bite.

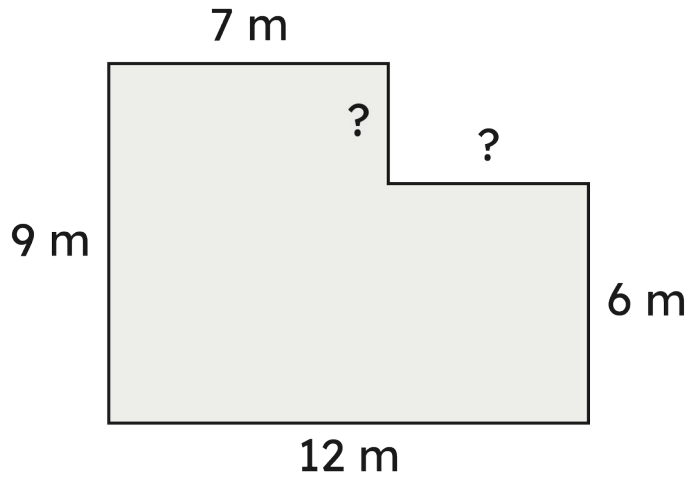
Subtract: box – bite.

Two rectangles instead of two pieces, and often fewer lengths to hunt for.

Notes

IV. Lengths that are not printed

A figure will not print every length. It prints enough.



Notes

Across matches across, down matches down

Across the top must total the same as across the bottom. 7 + 5 = 12

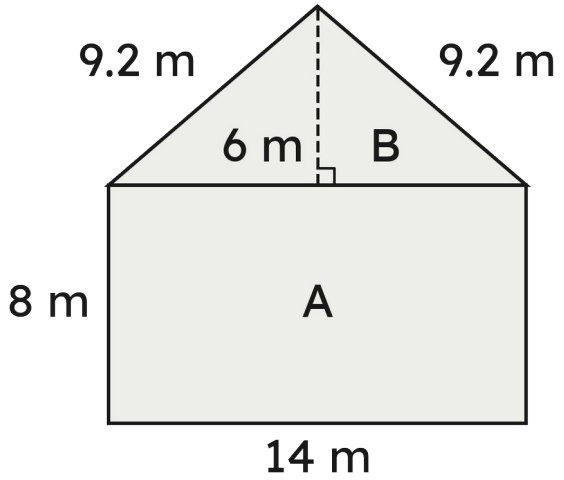
Down one side must total the same as down the other. 6 + 3 = 9

Do both subtractions first. Write the answers onto the figure.

Example 1

This is the end wall of a barn. Find its area.

What two shapes is this made of? Which printed length does the roof need? Is there a number here you do not need?



Example 1

$$A : 14 \times 8 = 112$$

$$B : \frac{1}{2}(14)(6) = 42$$

$$112 + 42 = 154 \text{ m}^2$$

Answer: 154 m²

Your Turn

Home plate cuts into a 6 in by 3 in rectangle and a triangle with a base of 6 in and a height of 3 in.

Find its area.

Your Turn

Home plate cuts into a 6 in by 3 in rectangle and a triangle with a base of 6 in and a height of 3 in.

Find its area.

Rectangle: $6 \times 3 = 18$

Triangle: $\frac{1}{2} \times 6 \times 3 = 9$

Add: $18 + 9 = 27$

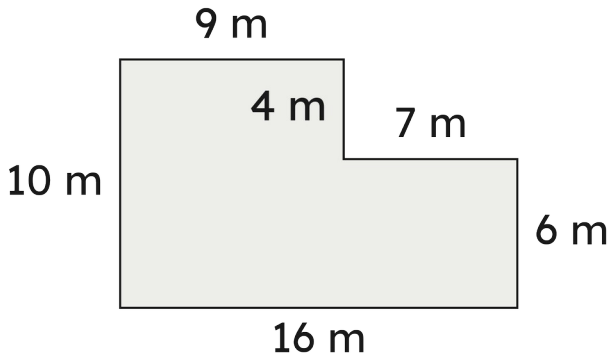
Answer: 27 in^2

Example 2

Deshawn found the area of this figure. He made two mistakes.

Deshawn's work: bottom piece: $16 \times 6 = 96$ top piece: $16 \times 4 = 64$

$$A = 96 + 64 = 160 \text{ m}$$



Find both mistakes.

Example 2

$16 \times 6 = 96$

$9 \times 4 = 36$

$96 + 36 = 132\ m^2$

Answer: 132 m², not 160

Your Turn

A patio cuts into two rectangles: 20 ft by 8 ft on the bottom, and 8 ft by 6 ft on top.

Find its area.

Your Turn

A patio cuts into two rectangles: 20 ft by 8 ft on the bottom, and 8 ft by 6 ft on top.

Find its area.

Bottom piece: $20 \times 8 = 160$

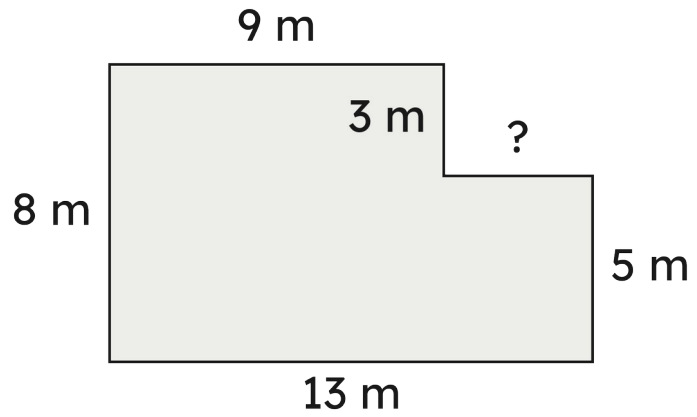
Top piece: $8 \times 6 = 48$

Add: $160 + 48 = 208$

Answer: 208 ft^2

Whiteboards · Question 1 of 9

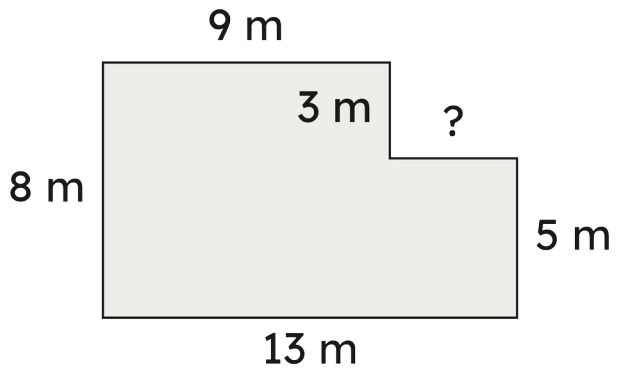
How long is the side marked with a question mark?



Answer it.

Whiteboards · Question 1 of 9

How long is the side marked with a question mark?



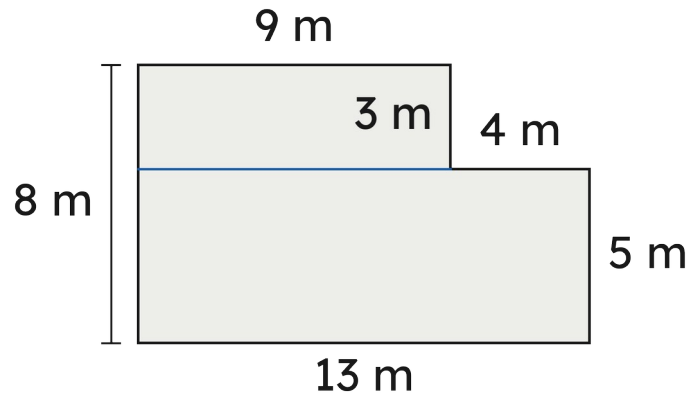
Across the bottom: 13 m. Across the top: 9 m.

13 – 9 = 4

Answer: ? = 4 m

Whiteboards · Question 2 of 9

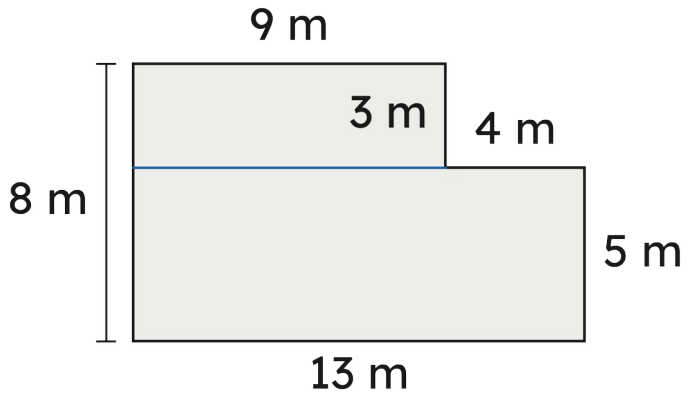
Cut the figure into two rectangles and find its area.



Answer it.

Whiteboards · Question 2 of 9

Cut the figure into two rectangles and find its area.



Bottom piece: $13 \times 5 = 65$

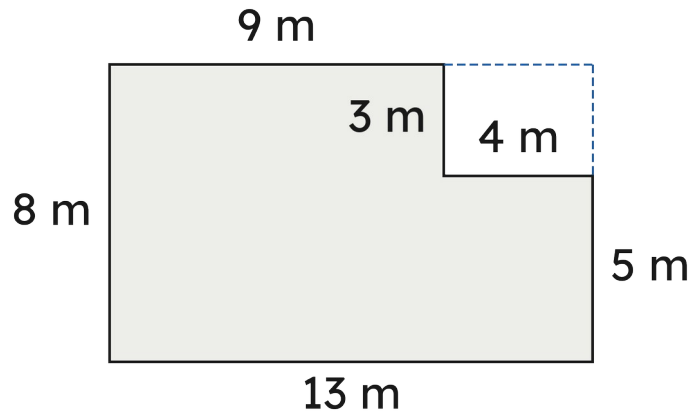
Top piece: $9 \times 3 = 27$

Add: $65 + 27 = 92$

Answer: $A = 92\ m^2$

Whiteboards · Question 3 of 9

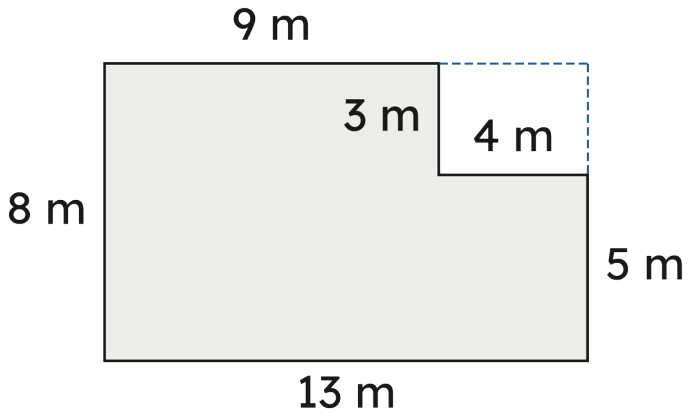
Now find the same area by boxing and subtracting.



Answer it.

Whiteboards · Question 3 of 9

Now find the same area by boxing and subtracting.



Whole box: $13 \times 8 = 104$

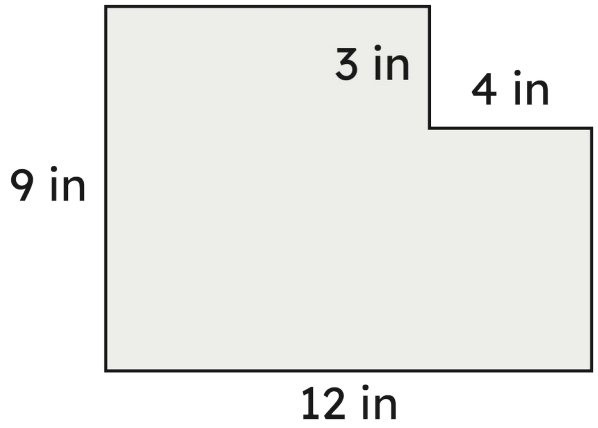
Missing corner: $4 \times 3 = 12$

Subtract: $104 - 12 = 92$

Answer: $A = 92\ m^2$

Whiteboards · Question 4 of 9

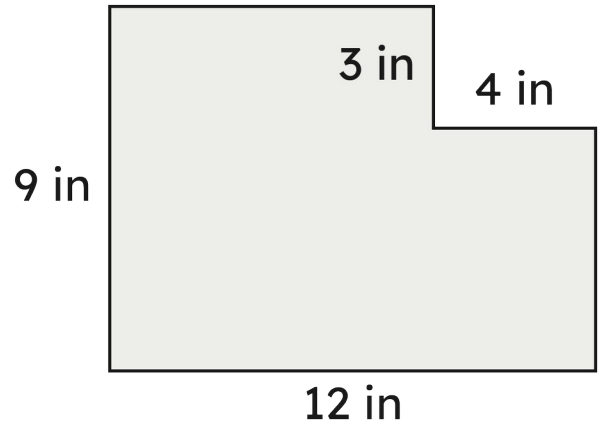
Find the area of the figure.



Answer it.

Whiteboards · Question 4 of 9

Find the area of the figure.



Whole box: $12 \times 9 = 108$

Missing corner: $4 \times 3 = 12$

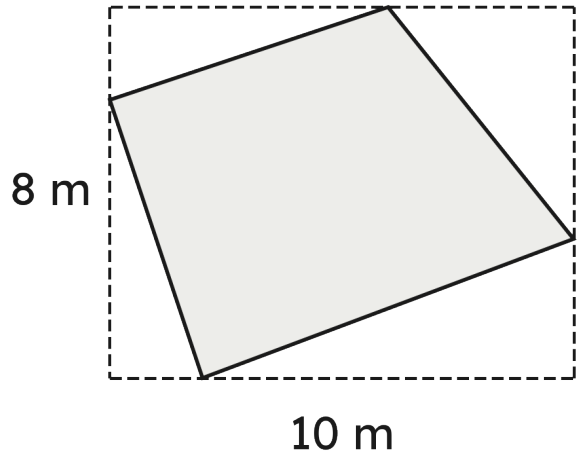
Subtract: $108 - 12 = 96$

Answer: $A = 96$ in²

Whiteboards · Question 5 of 9

The four corner triangles have areas of 6, 12, 10 and 6 m^2.

Find the area of the quadrilateral.

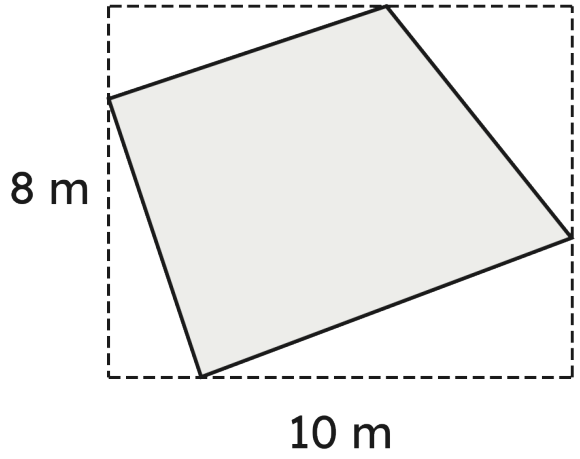


Answer it.

Whiteboards · Question 5 of 9

The four corner triangles have areas of 6, 12, 10 and 6 m².

Find the area of the quadrilateral.



Whole box: $10 \times 8 = 80$

Four corners: $6 + 12 + 10 + 6 = 34$

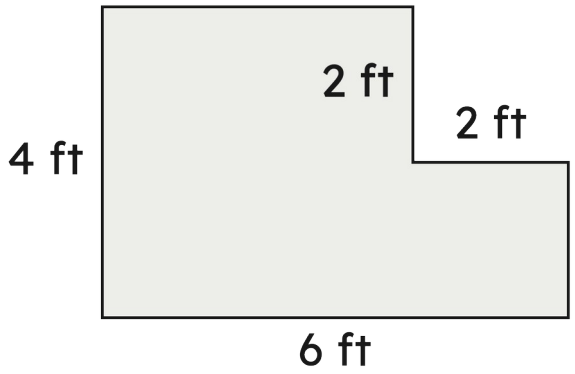
Subtract: $80 - 34 = 46$

Answer: A = 46 m²

Whiteboards · Question 6 of 9

Marisol multiplied 6 × 4 and answered 24 ft².

Is she right? If not, find the area.

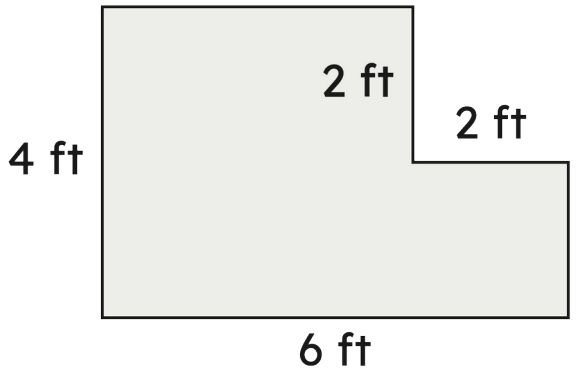


Answer it.

Whiteboards · Question 6 of 9

Marisol multiplied 6 × 4 and answered 24 ft².

Is she right? If not, find the area.



Whole box: $6 \times 4 = 24$

Missing corner: $2 \times 2 = 4$

Subtract: $24 - 4 = 20$

Answer: No — A = 20 ft²

Whiteboards · Question 7 of 9

A figure cuts into a 4 yd by 4 yd square and a triangle with a base of 3 yd and a height of 4 yd.

Find the area of the figure.

A. 22 yd^2

B. 28 yd^2

C. 24 yd^2

D. 16 yd^2

Answer it.

Whiteboards · Question 7 of 9

A figure cuts into a 4 yd by 4 yd square and a triangle with a base of 3 yd and a height of 4 yd.

Find the area of the figure.

Square: $4 \times 4 = 16$ Triangle: $\frac{1}{2} \times 3 \times 4 = 6$

Add: $16 + 6 = 22$

Answer: A — 22 yd²

Whiteboards · Question 8 of 9

A figure cuts into three rectangles: 12 ft by 3 ft, 8 ft by 3 ft, and 3 ft by 3 ft.

Find the area of the figure.

A. 60 ft^2

B. 69 ft^2

C. 108 ft^2

D. 45 ft^2

Answer it.

Whiteboards · Question 8 of 9

A figure cuts into three rectangles: 12 ft by 3 ft, 8 ft by 3 ft, and 3 ft by 3 ft.

Find the area of the figure.

$12 \times 3 = 36$ $\quad$ $8 \times 3 = 24$ $\quad$ $3 \times 3 = 9$

Add: $36 + 24 + 9 = 69$

Answer: B — 69 ft²

Whiteboards · Question 9 of 9

That same figure fits inside a 12 ft by 9 ft box. Two corners are missing: 9 ft by 3 ft, and 4 ft by 3 ft. Marcus answered 108 ft^2 in 5 minutes.

Explain what Marcus missed, then find the area of the figure.

Write your answer in sentences.

Whiteboards · Question 9 of 9

That same figure fits inside a 12 ft by 9 ft box. Two corners are missing: 9 ft by 3 ft, and 4 ft by 3 ft. Marcus answered 108 ft² in 5 minutes.

Explain what Marcus missed, then find the area of the figure.

Whole box: $12 \times 9 = 108$

Two corners: $9 \times 3 = 27$ and $4 \times 3 = 12$

Subtract: $108 - 27 - 12 = 69$

Answer: 69 ft² (Marcus got 108)

Before You Go

A composite figure has no formula, and it does not need one.

Cut it apart and add, or box it in and subtract.

Every length belongs to one piece.

IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 60. Due by the Unit 4 test.

Today's skills — all required

Area of compound figures with triangles (MRG)
Area of compound figures made of rectangles (NBA)