GRADE 7 · UNIT 4 · LESSON 2

Finding the Area of Trapezoids, Parallelograms and Rhombi

MA.7.GR.1.1

I can find the area of a trapezoid, a parallelogram and a rhombus.

Warm-Up

1. A parallelogram: base 9 cm, height 5 cm. Area?
2. A trapezoid: bases 6 in and 10 in, height 4 in. Area?
3. A rhombus: diagonals 8 m and 5 m. Area?
4. Which of the three formulas has no one-half? Why not?

Warm-Up

1. A parallelogram: base 9 cm, height 5 cm. Area? **45 cm²**
2. A trapezoid: bases 6 in and 10 in, height 4 in. Area? **32 in²**
3. A rhombus: diagonals 8 m and 5 m. Area? **20 m²**
4. Which of the three formulas has no one-half? Why not?

   The parallelogram — a rectangle rearranged.

Vocabulary

base

a side you measure a height from — a trapezoid has two, and they are the parallel pair

height

the perpendicular distance between the two bases; a slanted side is never a height

diagonal

a segment joining two corners that are not next to each other

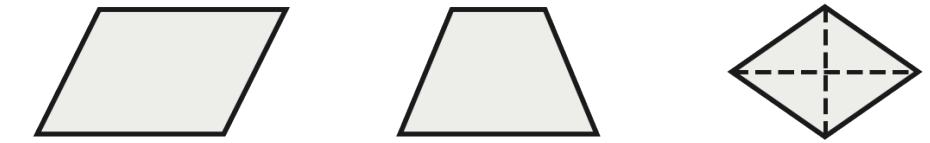
rhombus

a parallelogram with all four sides equal — its area comes from its diagonals

Notes

I. Three shapes, three formulas

On the state reference sheet a rhombus is listed with A = bh — the diagonal formula is not on it. Know this one.



parallelogram
$A = b \times h$

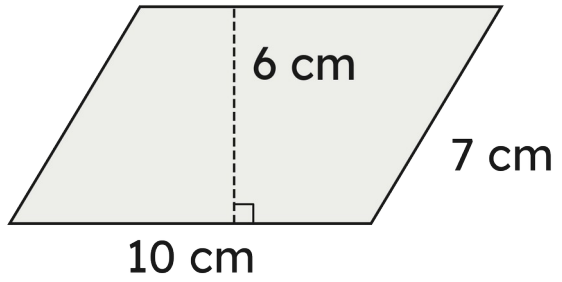
trapezoid
$A = \frac{1}{2} h (a + b)$

rhombus
$A = \frac{1}{2} p q$

Notes

II. Which number is the height?

The height is perpendicular to the base. A slanted side never is.



Notes

Which number is the height?

The height is perpendicular to the base. A slanted side never is.

Look for the right-angle mark. It is the only reliable clue.

On this figure: base 10 cm, height 6 cm. The 7 cm has no slot.

Notes

III. Forwards and backwards

base × height = AREA, in cm^2: multiply

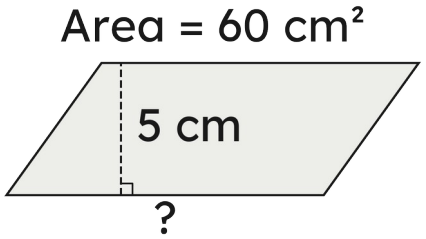
area ÷ height = LENGTH, in cm: divide

Notes

Forwards and backwards

$60 = b \times 5$, so $b = 60 \div 5 = 12$ cm

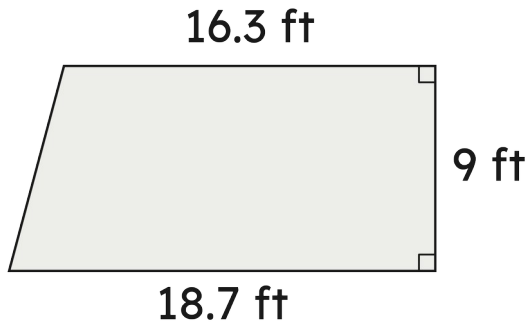
A length, so the unit is not squared.



Example 1

Kel is staining a deck. How much decking is there?

What shape is it? Which two sides are parallel? Which number is the height?



Example 1

Which number goes in which blank?

$$A = \frac{1}{2}\, h\,(a + b)$$

$$A = \frac{1}{2}(\quad)(\quad + \quad)$$

Example 1

Multiply first, or add first?

$$A = \frac{1}{2} h (a + b)$$

$$A = \frac{1}{2} (9)(18.7 + 16.3)$$

Example 1

$$A = \frac{1}{2}(9)(18.7 + 16.3)$$

$$A = \frac{1}{2}(9)(35)$$

$$A = 157.5$$

Answer: 157.5 ft²

Your Turn

A dugout bench seat is a trapezoid.

Its parallel sides are 7½ ft and 4½ ft, and its height is 2 ft.

Find the area of the seat.

Your Turn

A dugout bench seat is a trapezoid.

Its parallel sides are 7½ ft and 4½ ft, and its height is 2 ft.

Find the area of the seat.

Add the bases: $7.5 + 4.5 = 12$

$$A = \frac{1}{2} \times 2 \times 12 = 12$$

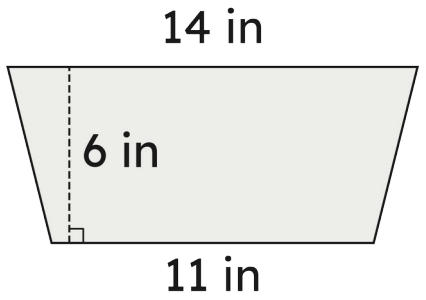
Answer: 12 ft²

Example 2

Don found the area of this trapezoid and got 119 in^2. Find his mistake.

Don's work: $A = \frac{1}{2} h (a + b) = \frac{1}{2} (14)(11 + 6)$

$= \frac{1}{2} (14)(17) = 119$ in^2



Example 2

$$A = \frac{1}{2}(14)(11 + 6)$$

14 is a base. The height is 6.

Answer: He put a base where the height goes.

Example 2

$$A = \frac{1}{2}(6)(14 + 11)$$

$$A = \frac{1}{2}(6)(25) = 75$$

75 in² fits inside the 14 × 6 box. 119 in² never could.

Answer: 75 in²

Your Turn

A parallelogram has an area of 75 cm^2 and a height of 6.25 cm.

Jocelyn wrote (75)(6.25) = 468.75, so the base is 468.75 cm.

Find her mistake and the correct base.

Your Turn

A parallelogram has an area of 75 cm^2 and a height of 6.25 cm.

Jocelyn wrote (75)(6.25) = 468.75, so the base is 468.75 cm.

Find her mistake and the correct base.

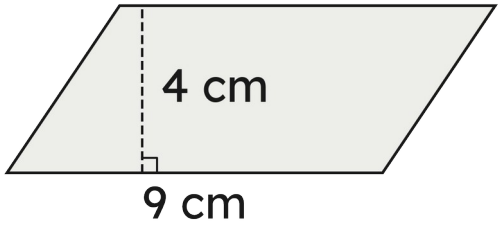
She multiplied. Base = area ÷ height.

75 ÷ 6.25 = 12

Answer: 12 cm

Whiteboards · Question 1 of 9

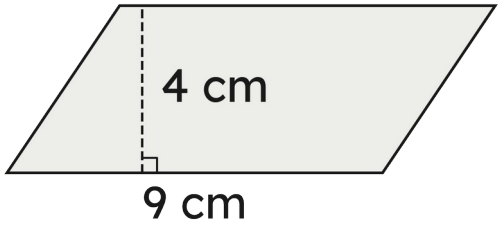
Find the area.



Answer it.

Whiteboards · Question 1 of 9

Find the area.



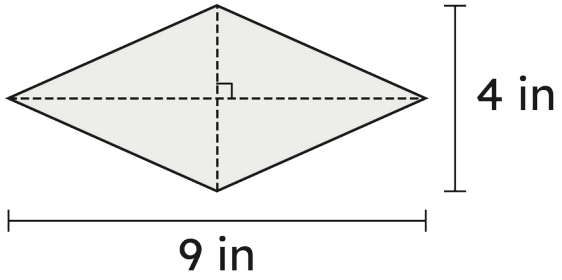
$A = b \times h$

$A = 9 \times 4 = 36$

Answer: 36 cm^2

Whiteboards · Question 2 of 9

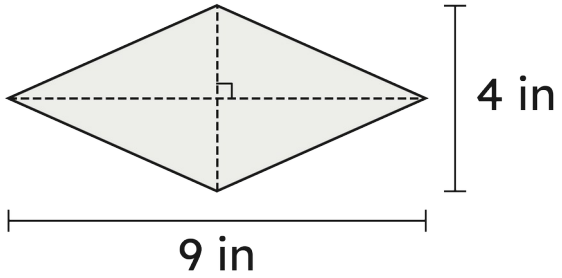
Find the area.



Answer it.

Whiteboards · Question 2 of 9

Find the area.



$$A = \frac{1}{2} \times p \times q$$

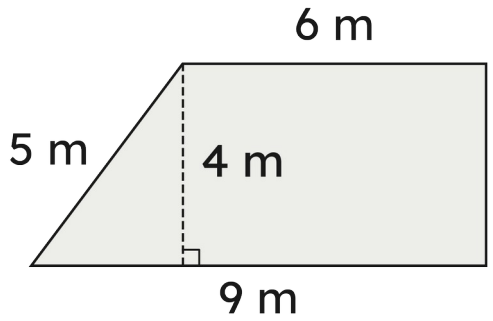
$$A = \frac{1}{2} \times 9 \times 4 = 18$$

Answer: 18 in²

Whiteboards · Question 3 of 9

This trapezoid's slanted side is 5 m long.

Find the area of the trapezoid.

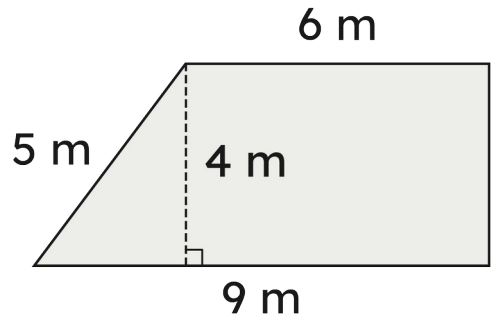


Answer it.

Whiteboards · Question 3 of 9

This trapezoid's slanted side is 5 m long.

Find the area of the trapezoid.



$$A = \frac{1}{2} \times h \times (a + b)$$

$$A = \frac{1}{2} \times 4 \times (9 + 6) = \frac{1}{2} \times 4 \times 15 = 30$$

Answer: 30 m²

Whiteboards · Question 4 of 9

A parallelogram has a base of 7.8 in and a height of 11.7 in.

Find its area.

Answer it.

Whiteboards · Question 4 of 9

A parallelogram has a base of 7.8 in and a height of 11.7 in.

Find its area.

$$A = b \times h$$

$$A = 7.8 \times 11.7 = 91.26$$

Answer: 91.26 in²

Whiteboards · Question 5 of 9

A rhombus-shaped floor tile has diagonals of 18 cm and 14 cm.

Find its area.

Answer it.

Whiteboards · Question 5 of 9

A rhombus-shaped floor tile has diagonals of 18 cm and 14 cm.

Find its area.

$$A = \frac{1}{2} \times p \times q$$

$$A = \frac{1}{2} \times 18 \times 14 = 126$$

Answer: 126 cm²

Whiteboards · Question 6 of 9

A horse pasture is a trapezoid. Its parallel sides are 168.2 yd and 135.6 yd, and the distance between them is 93.4 yd.

Find the area of the pasture.

Answer it.

Whiteboards · Question 6 of 9

A horse pasture is a trapezoid. Its parallel sides are 168.2 yd and 135.6 yd, and the distance between them is 93.4 yd.

Find the area of the pasture.

Add the bases: $168.2 + 135.6 = 303.8$

$$A = \frac{1}{2} \times 93.4 \times 303.8 = 46.7 \times 303.8 = 14{,}187.46$$

Answer: 14,187.46 yd²

Whiteboards · Question 7 of 9

An eraser is shaped like a parallelogram. Its base is 1½ in and its height is ½ in.

Find the area of its top.

A. 3 in^2

B. 1½ in^2

C. ¾ in^2

D. 2 in^2

Answer it.

Whiteboards · Question 7 of 9

An eraser is shaped like a parallelogram. Its base is 1½ in and its height is ½ in.

Find the area of its top.

$$A = b \times h$$

$$A = \frac{3}{2} \times \frac{1}{2} = \frac{3}{4}$$

Answer: C — ¾ in²

Whiteboards · Question 8 of 9

A sports-campus building has a rhombus roof. One diagonal is 255.4 m and the other is 203.7 m.

Find the roof's area.

A. 2,601.249 m²

B. 459.1 m²

C. 52,024.98 m²

D. 26,012.49 m²

Answer it.

Whiteboards · Question 8 of 9

A sports-campus building has a rhombus roof. One diagonal is 255.4 m and the other is 203.7 m.

Find the roof's area.

$$255.4 \times 203.7 = 52{,}024.98$$

$$A = \frac{1}{2} \times 52{,}024.98 = 26{,}012.49$$

Answer: D — 26,012.49 m²

Whiteboards · Question 9 of 9

Nadia's trapezoid has bases 16 cm and 9 cm and a height of 4 cm. She wrote $A = \frac{1}{2}(16)(9 + 4) = 104$ cm^2.

Name her mistake and find the correct area.

Write your answer in sentences.

Whiteboards · Question 9 of 9

Nadia's trapezoid has bases 16 cm and 9 cm and a height of 4 cm. She wrote A = ½(16)(9 + 4) = 104 cm².

Name her mistake and find the correct area.

The height is 4. The bases are 16 and 9.

$$A = \frac{1}{2} \times 4 \times (16 + 9) = \frac{1}{2} \times 4 \times 25 = 50$$

Answer: She used 16 as the height. 50 cm²

Before You Go

Write the formula first. Every time.

The height is the one with the right-angle mark. A slanted side never is.

Add the bases first. The brackets say so.

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 a parallelogram (P6T)
Area of a trapezoid (JYV)
Area of rhombuses (DPB)