Visual Learning Animation

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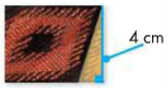
Where do you cut the parallelogram to form the triangle? [Cut on the height of the parallelogram.] *On which side of the parallelogram should you cut out the triangle?* [It does not matter as long as you cut on the height.]

Step 2

The triangle can be placed along the other side to form a rectangle.



How is the rectangle formed from the parallelogram? What type of transformation is used? [The right triangle is slid from the left side to the right side. It is a translation.]

Think length = base (b)
width = height (h)

Use the formula to find the area of a parallelogram.

Area = base × height
$A = b \times h$
$A = 8 \text{ cm} \times 4 \text{ cm}$
$A = 32 \text{ cm}^2$

The area of the parallelogram is 32 square centimeters.

Suppose the base is 12 cm and the height is 6 cm. What is the area of the parallelogram? [72 cm^2]

Prevent Misconceptions

Students may confuse the height with slant length, or slant height. Emphasize that for a parallelogram the height is the length of a segment from one vertex perpendicular to the base.

Step 1

The shaded triangle of the parallelogram can be cut off.

Step 2

The triangle can be placed along the other side to form a rectangle.

Think length = base (b)
width = height (h)

Use the formula to find the area of a parallelogram.

Area = base × height
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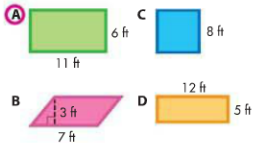
The area of the parallelogram is 32 square centimeters.

Problem Solving

12. Parallelogram A has a base of 12 ft and a height of 11 ft. Parallelogram B has a base of 13 ft and a height of 10 ft. Which parallelogram has the greater area? How much greater is the area?
Parallelogram A; 2 ft^2

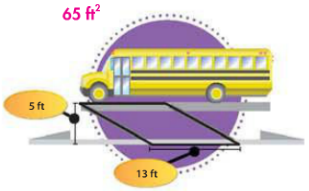
13. Each morning, Kathie rides the train 9 km to work. The train takes 10 minutes to travel $4\frac{1}{2}$ km. How much time does Kathie spend on the train each day going to and from work?
40 minutes

14. Which of these figures has the greatest area?



15. A store display has 36 bottles of perfume on the bottom shelf, 30 bottles on the shelf above that, and 24 on the shelf above that. If this pattern continues, how many bottles will be on the next shelf above?
18 bottles

16. What is the area of the parallelogram lift shown below?
65 ft^2



17. **Writing to Explain** Kurt bought two items that cost a total of $100. One item cost $10 more than the other. What was the cost of each item? Explain your reasoning.
See margin.

18. **Algebra** Paige knows the area of a parallelogram is 54 square inches. The base of this parallelogram is 9 inches, and the height is h inches. What is the measure for the height of this parallelogram?
6 in.

Answer

17. $45 and $55.
Sample answer: I knew that the cost of the two items had to add up to $100, but still have a difference of $10. I subtracted $10 from $100 to get $90 and then divided $90 ÷ 2 to get $45. $45 + 10 = $55.

Problem Solving

Exercise	Content
12	Area of Parallelograms Multiple Step [(12 × 11) − (13 × 10)]
13	Multiple Step [(9 ÷ $4\frac{1}{2}$) × 10 × 2]
14	Area of Squares and Rectangles Area of Parallelograms
15	Patterns
16	Area of a Parallelogram (16 × 5)]
17	Reasoning (100 − 10) ÷ 2; 45 + 10 Multiple Step [(100 − 10) ÷ 2 = 45; 45 + 10 = 55]
18	Use a Formula ($A = b \times h$) Area (54 ÷ 9)

Students use underlying processes and mathematical tools for Exercises 12–18. Remind students to check for reasonableness when solving each problem.

Exercise 13

Problem-Solving Skill: Draw a Picture A picture might help students choose the computation they need to solve this problem. *Draw a line to show how far Kathie rides to work. What is the distance she rides to work?* [9 km] *How far does the train go in 10 minutes?* [$4\frac{1}{2}$ km] *What operation do you need to use to find out how many groups of $4\frac{1}{2}$ are in 9?* [Division] *How can you figure out how long her trip to work will take?* [Multiply by 10.]

Exercise 14

Test-Taking Tip: Gather Information Remember to use the pictures for information. *Which polygons have the smallest dimensions?* [The parallelogram with a base of 7 and a height of 3 is the smallest polygon.] *Can you eliminate any of the other polygons without computing the area?* [No; the rest have dimensions that are close to each other.]