teacher page

UNIT 1

Lesson 4

Parallelograms

Materials needed for this lesson

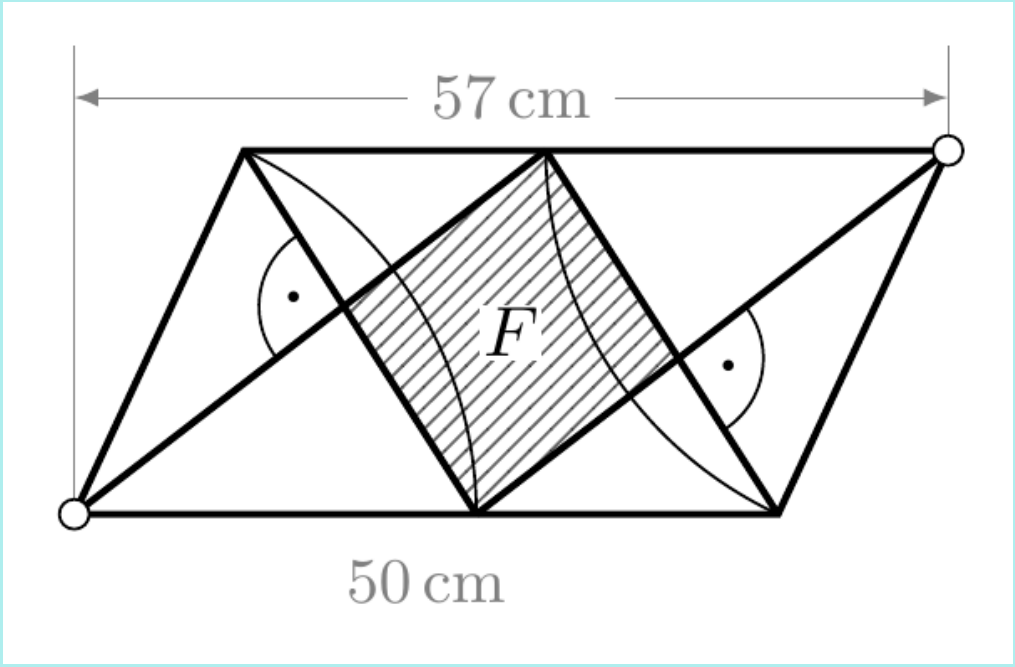
- geometry toolkits

tracing paper, graph paper, colored pencils, scissors, and an index card to use as a straightedge or to mark right angles.

UNIT 1

Lesson 4

Parallelograms



UNIT 1

Lesson 4

Parallelograms

Objective:

- *I can use reasoning strategies and what I know about the area of a rectangle to find the area of a parallelogram.*
- *I know how to describe the features of a parallelogram using mathematical vocabulary.*

Let's investigate the features and area of parallelograms.

Warm-up

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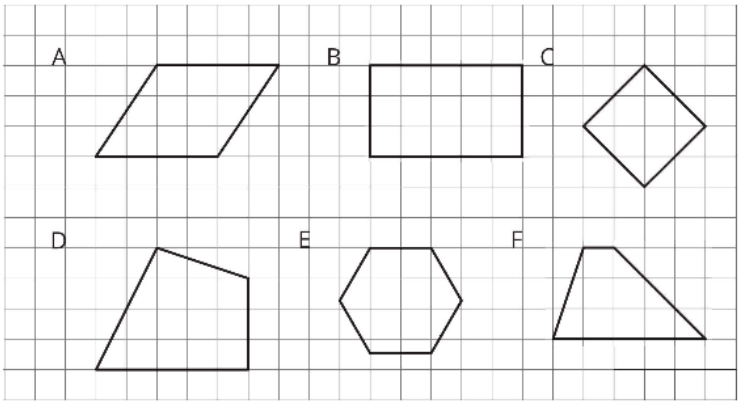
NAME DATE PERIOD

Unit 1, Lesson 4: Parallelograms

Let's investigate the features and area of parallelograms.

4.1: Features of a Parallelogram

Figures A, B, and C are **parallelograms**. Figures D, E, and F are *not* parallelograms.



Study the examples and non-examples. What do you notice about:

1. the number of sides that a parallelogram has?

2. opposite sides of a parallelogram?

3. opposite angles of a parallelogram?

4.2: Area of a Parallelogram

Find the area of each parallelogram. Show your reasoning.

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☆ link to worksheet

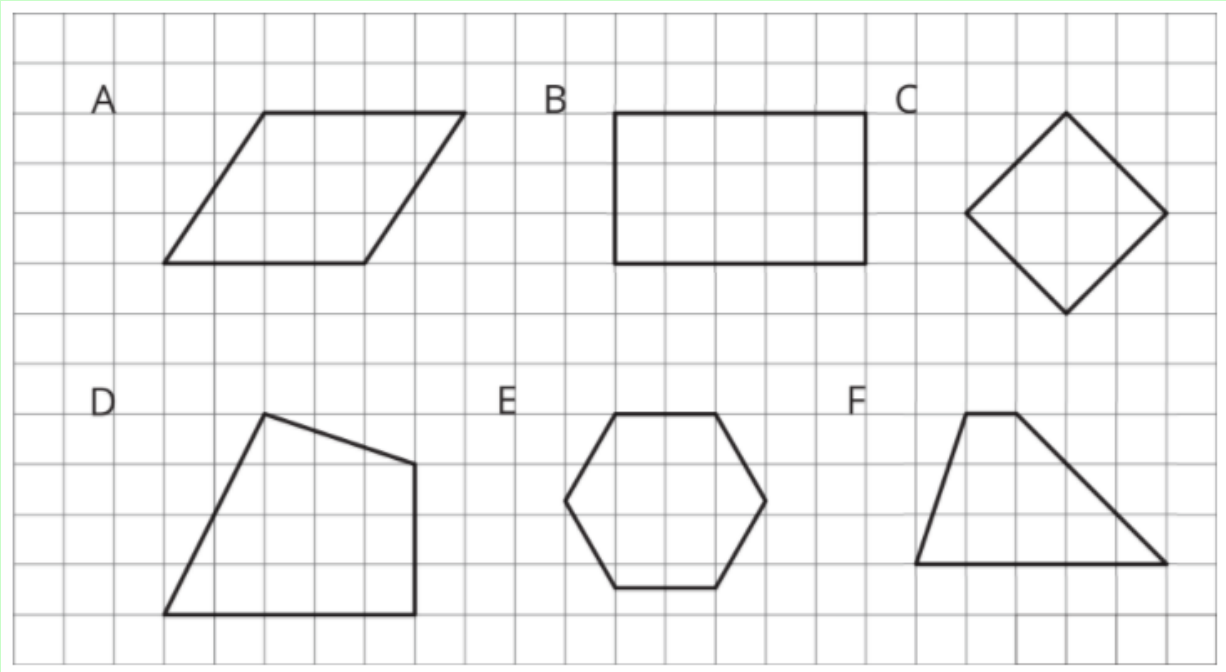
Cont...

Warm-up

2 students
3 min quiet time
1 min partner talk

4.1 Features of a Parallelogram

Figures A, B, and C are parallelograms.
Figures D, E, and F are not parallelograms.



Study the examples and non-examples. What do you notice about:

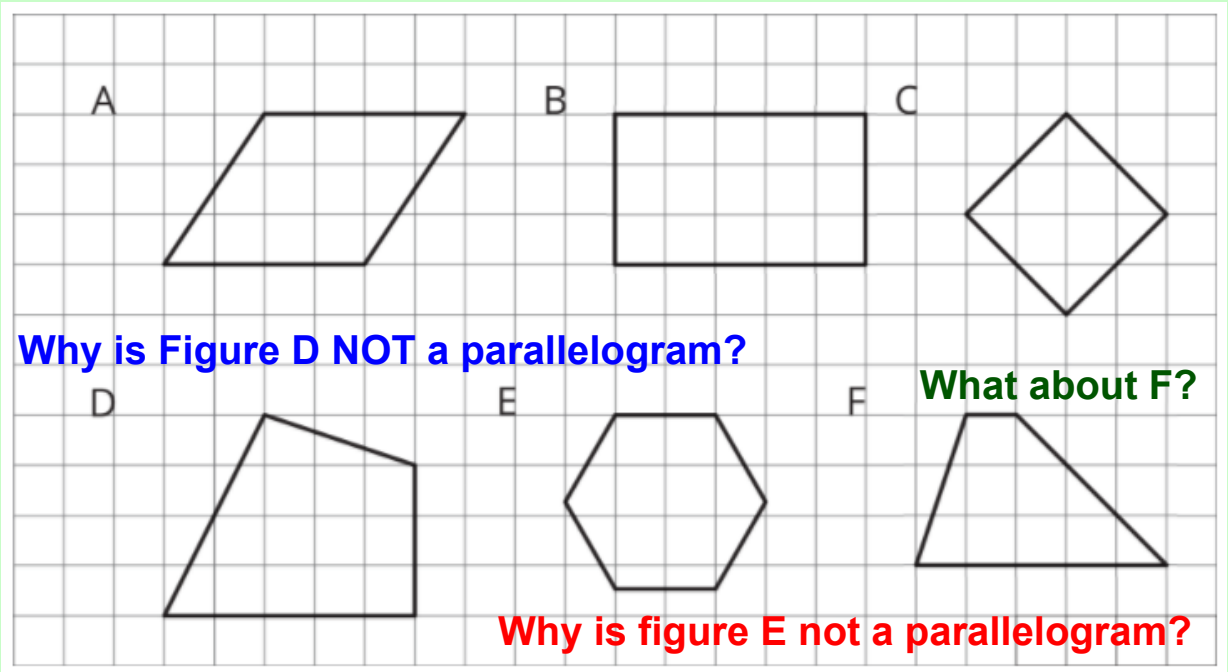
1. the number of sides that a parallelogram has?
2. opposite sides of a parallelogram?
3. opposite angles of a parallelogram?

Cont...

Warm-up

4.1 Features of a Parallelogram

Figures A, B, and C are parallelograms.
Figures D, E, and F are not parallelograms.



What's our definition of "parallelogram"?

Activity 4.2

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NAME DATE PERIOD

4.2: Area of a Parallelogram

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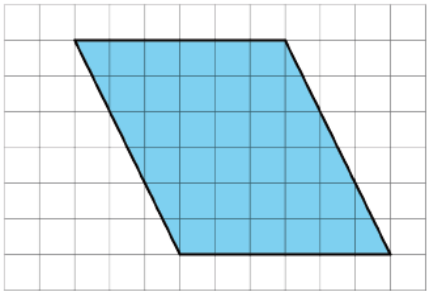
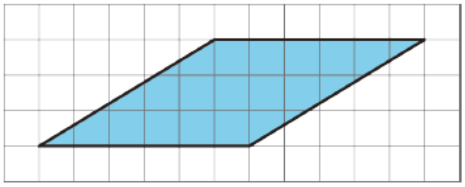
Find the area of each parallelogram. Show your reasoning.





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Cont...

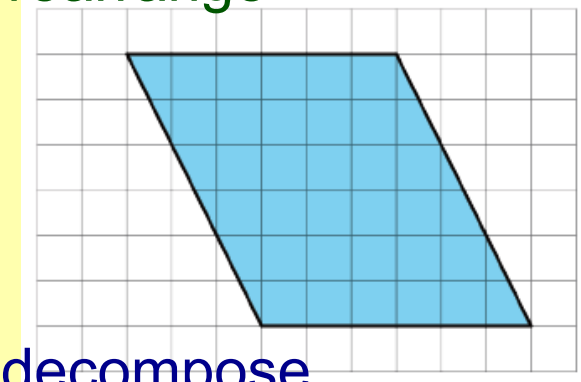
4.2 Activity

2-4 students
5 min quiet time
2-3 min partner talk

4.2 Area of a Parallelogram

Find the area of each parallelogram.
Show your reasoning.

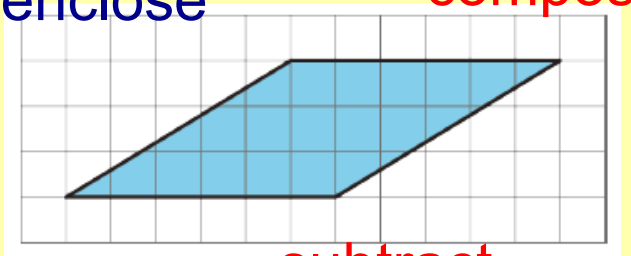
rearrange



decompose

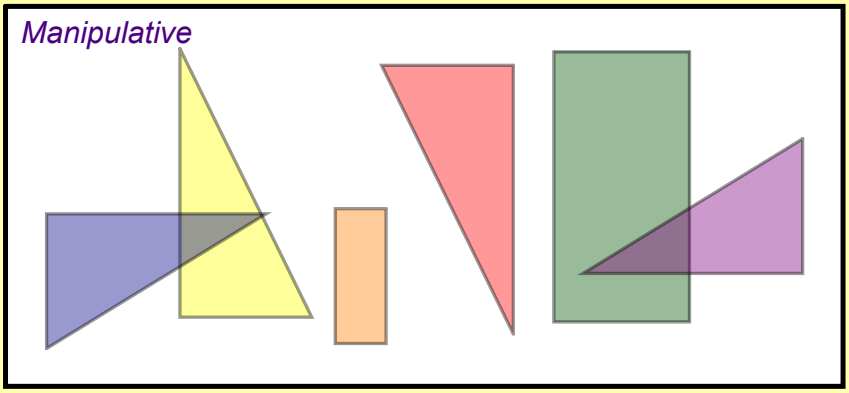
enclose

compose



subtract

Manipulative



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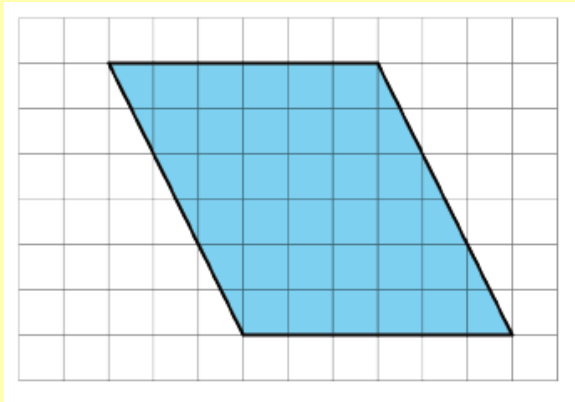
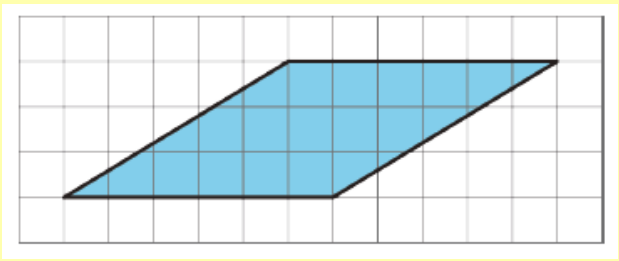
Activity Synthesis

4.2 Area of a Parallelogram

Find the area of each parallelogram. Show your reasoning.

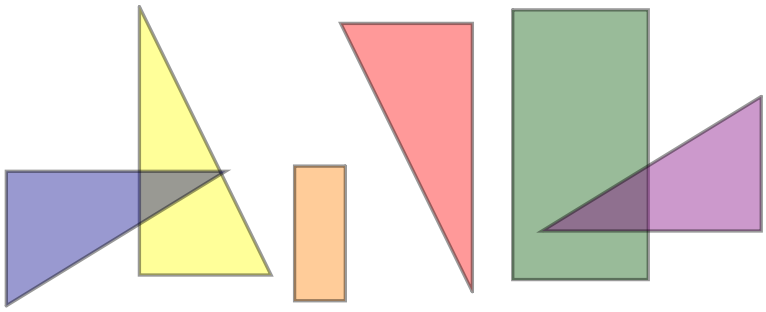


Did you decompose the parallelograms?



Did you rearrange any pieces?

Manipulative



What strategies did you use?

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Cont...

Activity 4.2

Are You Ready for More

THERE IS NO "Are You Ready For More?" IN THIS LESSON

Cont...

Activity 4.3

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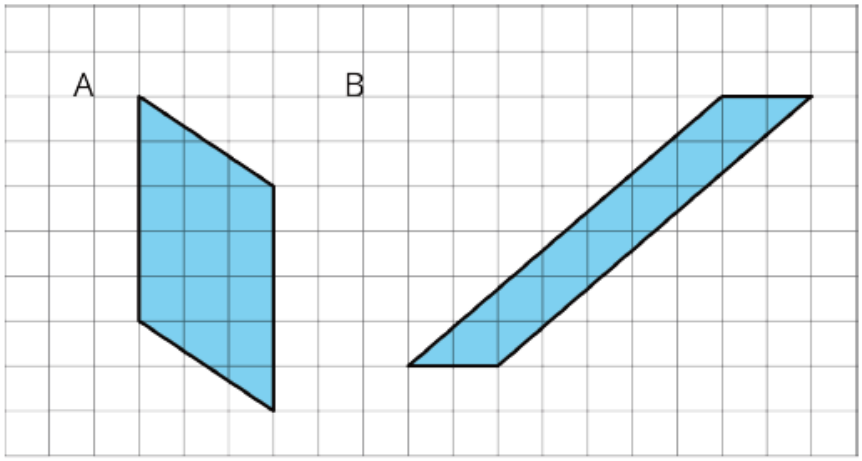
4.3: Lots of Parallelograms

Find the area of the following parallelograms. Show your reasoning.



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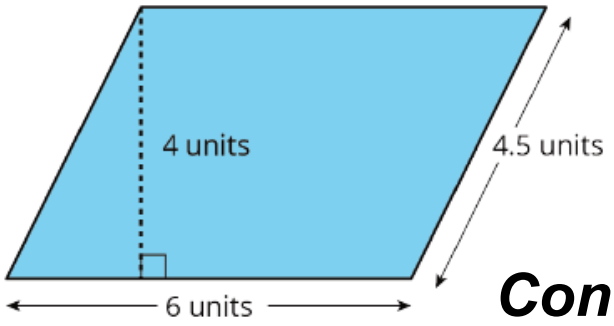

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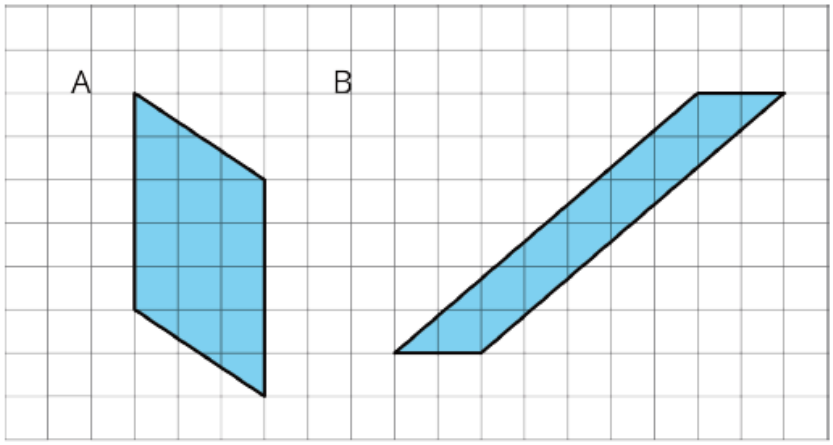
Cont...

4.3 Activity

2-4 students
7-8 min quiet time
5 min partner talk

4.3: Lots of Parallelograms

Find the area of the following parallelograms. Show your reasoning.



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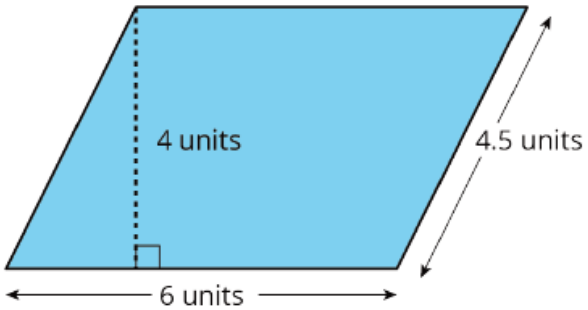

THINK:
What measurements of the parallelograms seem to be helpful in finding their areas?

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Cont...

Activity Synthesis

Possible Solution

PULL

4.3 Lots of a Parallelograms

Possible Solution

PULL

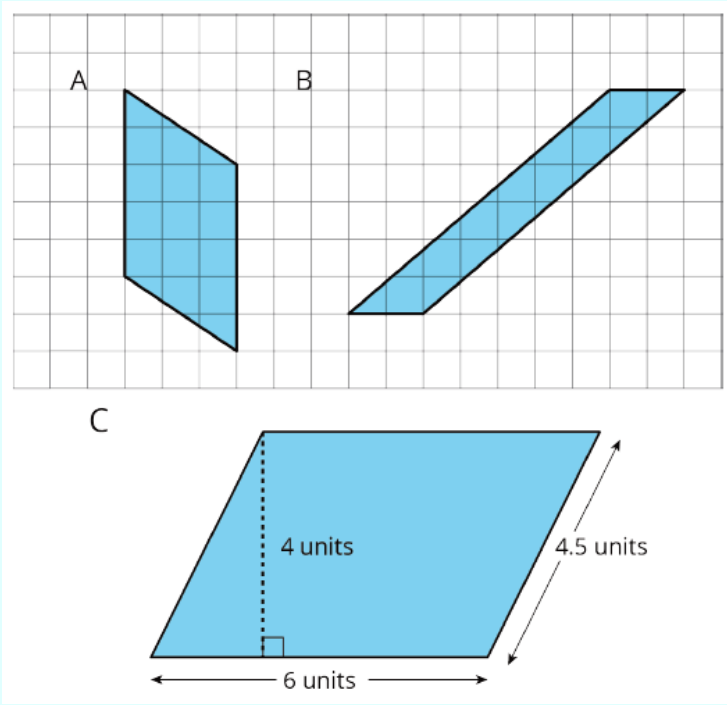
Why did your strategy make the most sense to you for this parallelogram?

Is Parallelogram A different than others you have seen so far?

How so?

Three measurements are shown for Parallelogram C. Which ones could you use to find the area? Which ones would you not use? Why and why not?

Does decomposing and rearranging, or enclosing and subtracting seem more practical for finding a parallelogram such as B? Why?



Cont...
Part 1 of 2

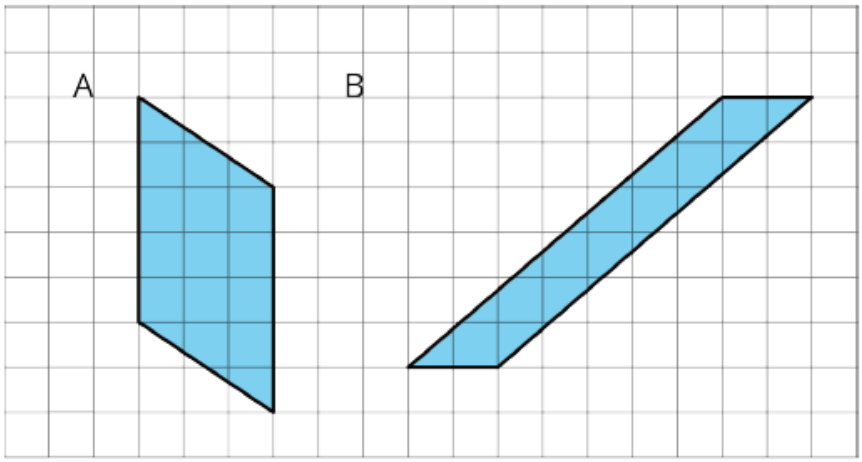
☆ link to worksheet

Activity Synthesis

4.3 Lots of a Parallelograms

Why use a rectangle?

When you decomposed and rearranged the parallelogram into another shape, did the area change?



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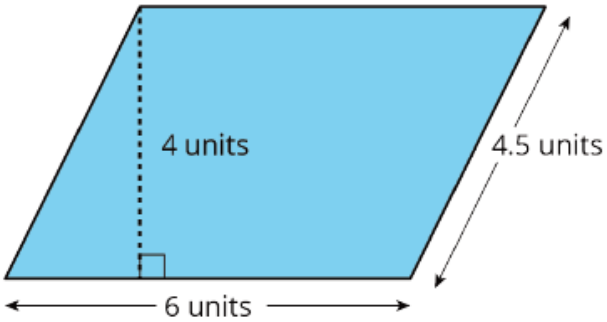

Possible Solution PULL

Possible Solution PULL

Cont...
Part 2 of 2

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Lesson Synthesis

A parallelogram has four sides. The opposite sides of a parallelogram are congruent

The opposite sides of a parallelogram have equal length.

Parallelograms can be composed and decomposed or possibly enclosed with a rectangle and the area of the extra peices subtracted from the area of the rectangle.

The angles opposite of a parallelogram have equal measure.

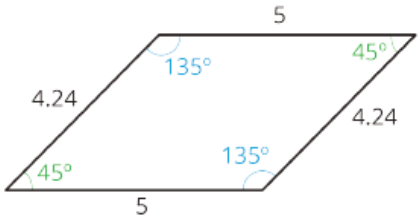
Lesson Summary

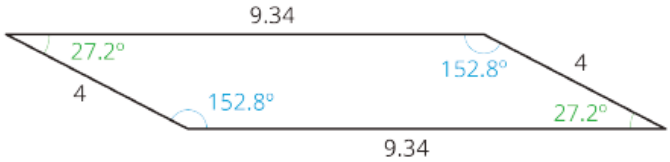
Read through your Lesson Summary...

Lesson 4 Summary

A **parallelogram** is a quadrilateral (it has four sides). The opposite sides of a parallelogram are parallel. It is also true that:

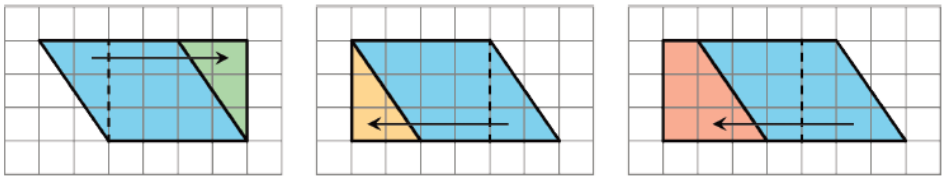
- The opposite sides of a parallelogram have equal length.
- The opposite angles of a parallelogram have equal measure.



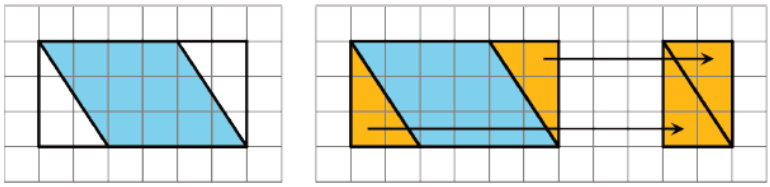


There are several strategies for finding the area of a **parallelogram**.

- We can decompose and rearrange a parallelogram to form a rectangle. Here are three ways:

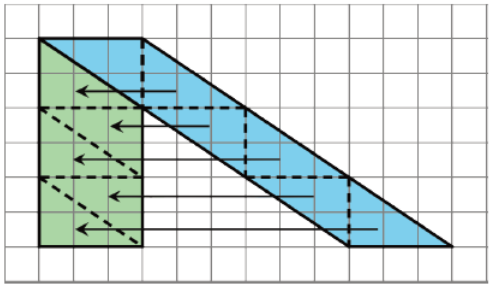


- We can enclose the parallelogram and then subtract the area of the two triangles in the corner.



Both of these ways will work for any parallelogram.

For some parallelograms, however, the process of decomposing and rearranging requires a lot more steps than if we enclose the parallelogram with a rectangle and subtract the combined area of the two triangles in the corners. Here is an example.



Lesson 4 Glossary Terms

- parallelogram

☆ link to worksheet

Cool Down

COMPLETE YOUR "COOL DOWN"

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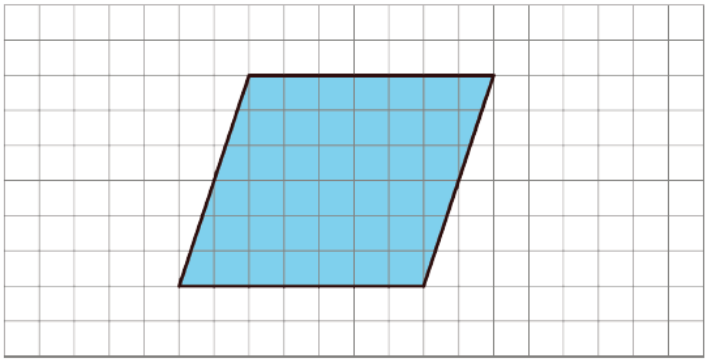
Unit 1, Lesson 4: Parallelograms

How would you find the area of this parallelogram? Describe your strategy.



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PRACTICE PROBLEMS

Practice Problems **Page 1**

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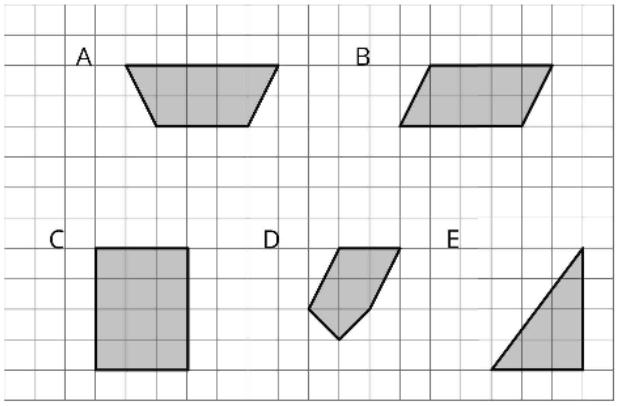
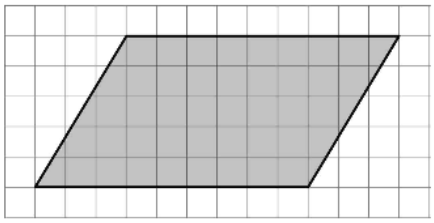
NAME DATE PERIOD

Unit 1, Lesson 4: Parallelograms

1. Select **all** of the parallelograms. For each figure that is *not* selected, explain how you know it is not a parallelogram.

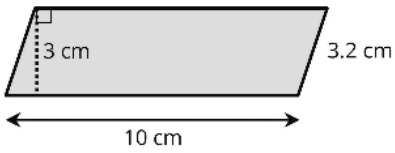


2. a. Decompose and rearrange this parallelogram to make a rectangle.



b. What is the area of the parallelogram? Explain your reasoning.

3. Find the area of the parallelogram.



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Cont...

Unit 1: Area and Surface Area Lesson 4: Parallelograms 1

PRACTICE PROBLEMS

Page 2

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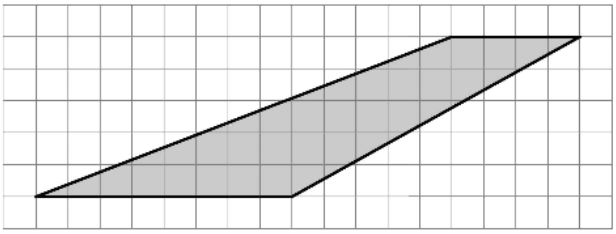
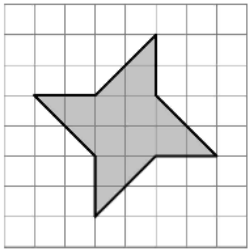
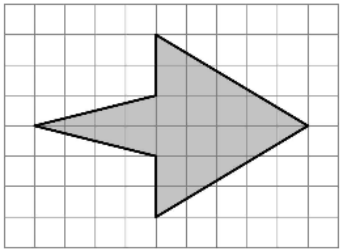
NAME DATE PERIOD

4. Explain why this quadrilateral is *not* a parallelogram.



5. Find the area of each shape. Show your reasoning. (from Unit 1, Lesson 3)





6. Find the areas of the rectangles with the following side lengths. (from Unit 1, Lesson 1)

a. 5 in and $\frac{1}{3}$ in

b. 5 in and $\frac{4}{3}$ in

c. $\frac{5}{2}$ in and $\frac{4}{3}$ in

d. $\frac{7}{6}$ in and $\frac{6}{7}$ in

☆ link to worksheet

Cont...

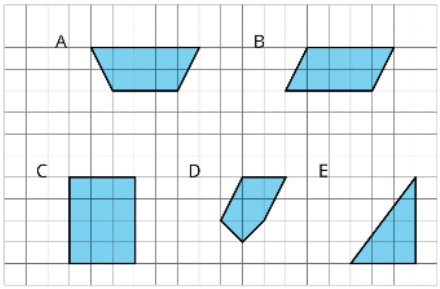
5. Disagree. Because one 8-inch tile covers the same area as four 4-inch tiles, she will need $\frac{1}{16}$ as many 8-inch tiles as she would with 2-inch tiles.

PRACTICE SOLUTIONS

Lesson 4

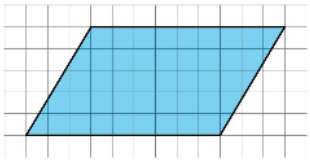
Problem 1

Select **all** of the parallelograms. For each figure that is *not* selected, explain how you know it is not a parallelogram.



Problem 2

a. Decompose and rearrange this parallelogram to make a rectangle.

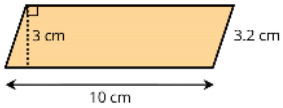


b. What is the area of the parallelogram? Explain your reasoning.

Solution

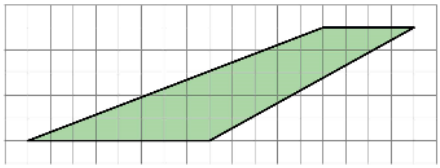
Problem 3

Find the area of the parallelogram.



Problem 4

Explain why this quadrilateral is *not* a parallelogram.



Solution

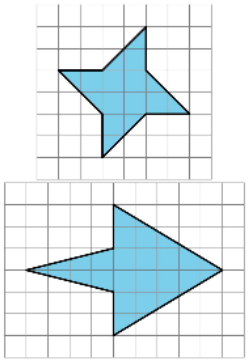
☆ link to worksheet

Cont...

PRACTICE SOLUTIONS

Problem 5

(from Unit 1, Lesson 3)
Find the area of each shape. Show your reasoning.



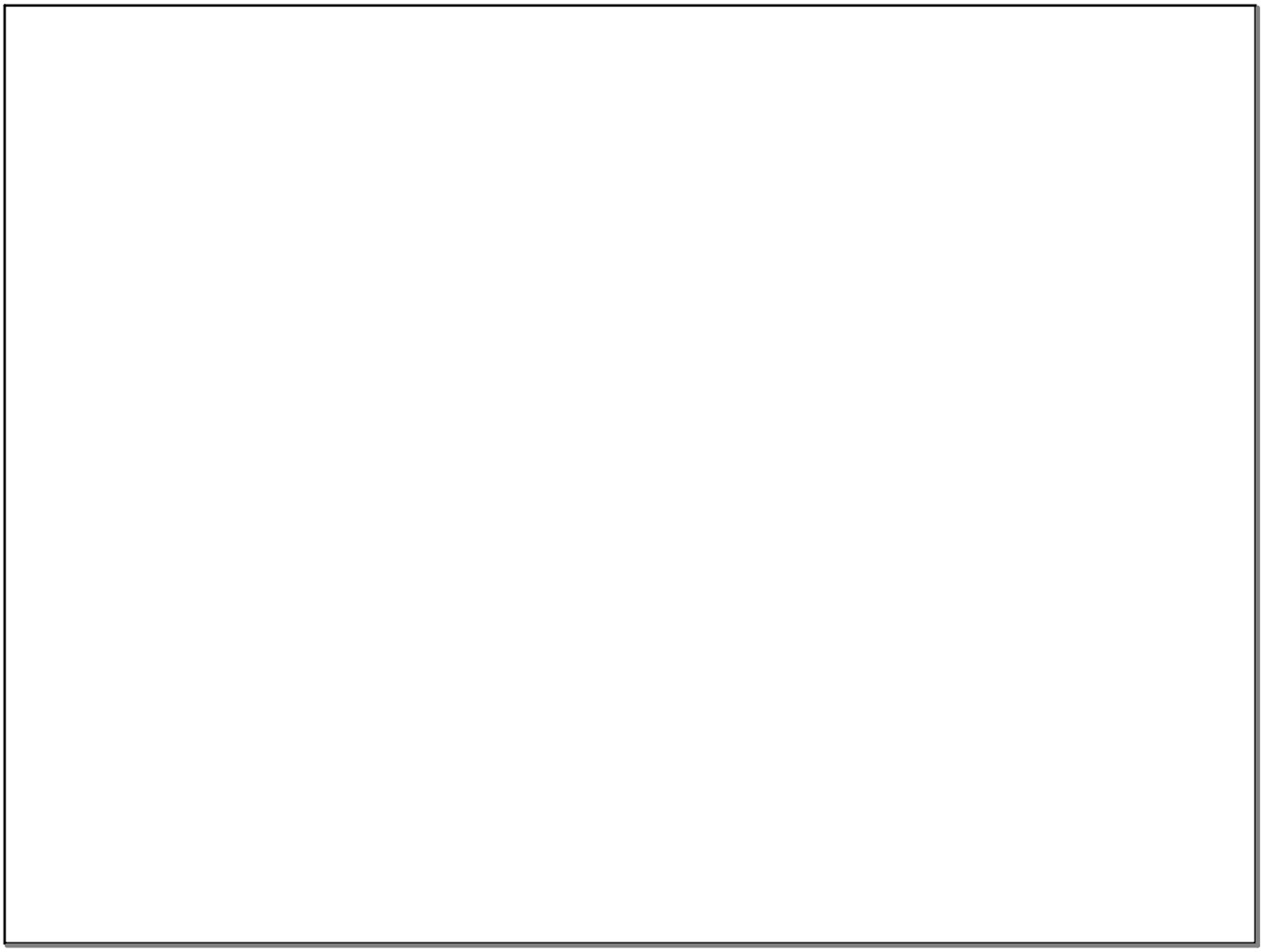
Problem 6

(from Unit 1, Lesson 1)
Find the areas of the rectangles with the following side lengths.

1. 5 in and $\frac{1}{3}$ in
2. 5 in and $\frac{4}{3}$ in
3. $\frac{5}{2}$ in and $\frac{4}{3}$ in
4. $\frac{7}{6}$ in and $\frac{6}{7}$ in

Solution

☆ link to worksheet



Jun 4-1:22 PM

Attachments

- 6-1-4a student_task_statements.pdf
- 6-1-4b student_cool_down.pdf
- 6-1-4c practice_problems.pdf