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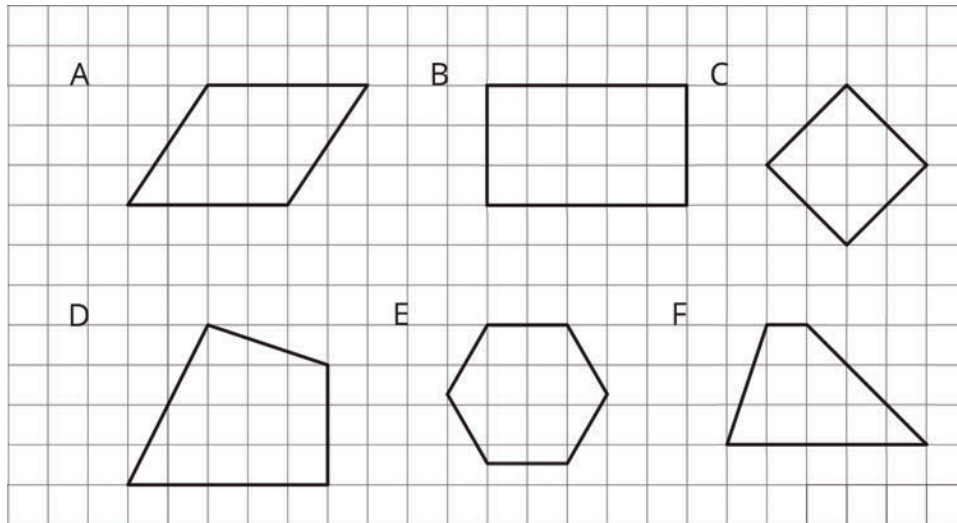
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Unit 1, Lesson 4: Parallelograms

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.



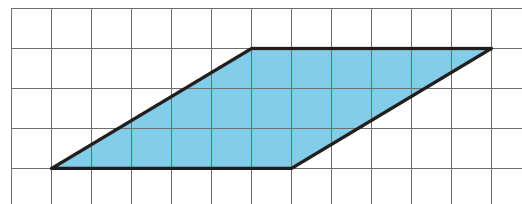
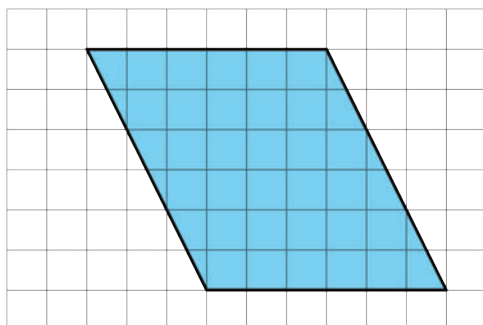
Study the examples and non-examples. What do you notice about:

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

m.openup.org/1/6-1-4-2

Find the area of each parallelogram. Show your reasoning.



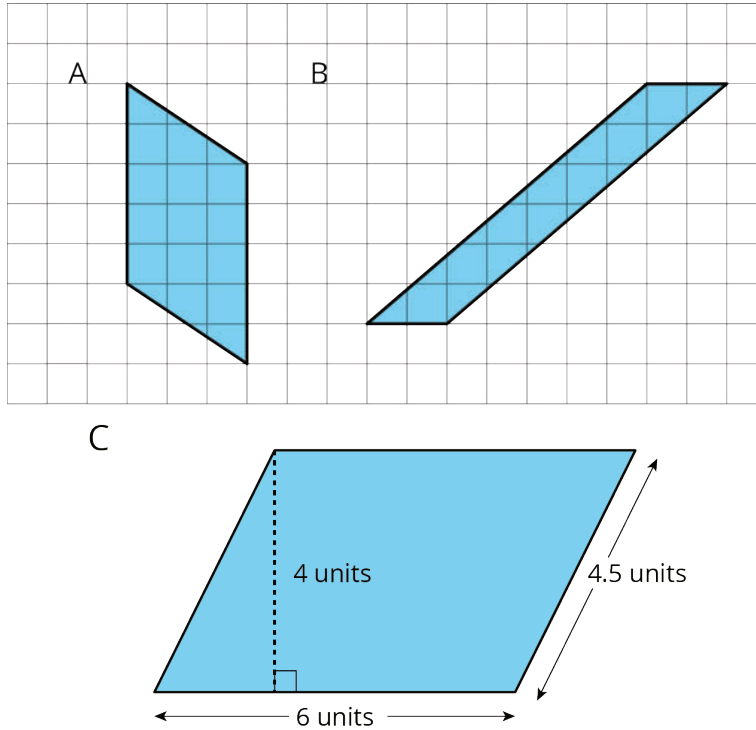
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4.3: Lots of Parallelograms

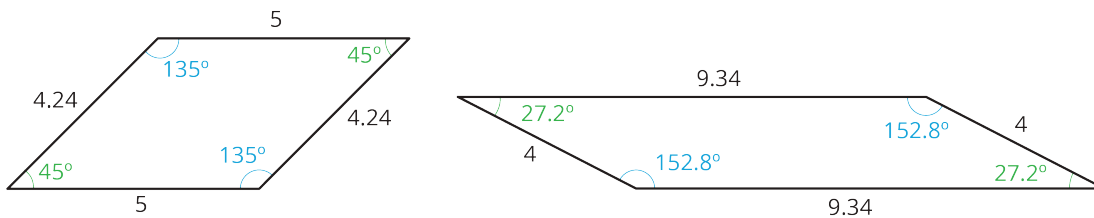
Find the area of the following parallelograms. Show your reasoning.



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.



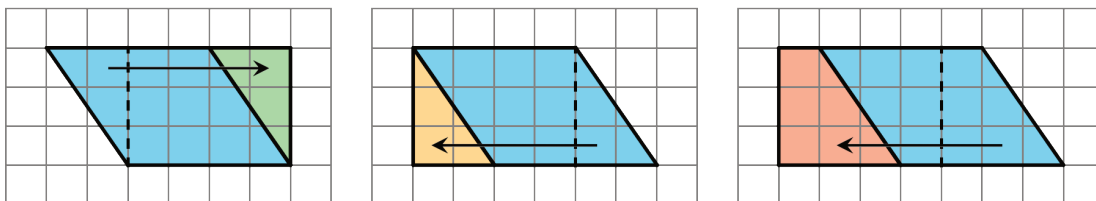
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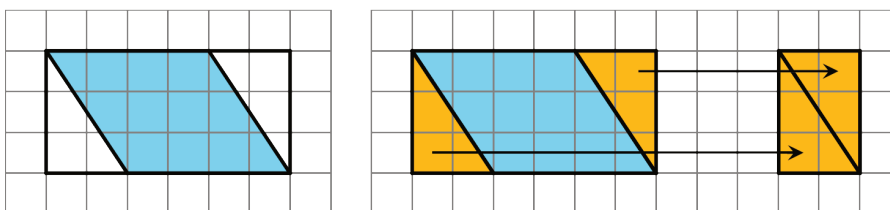
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There are several strategies for finding the area of a **parallelogram**.

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

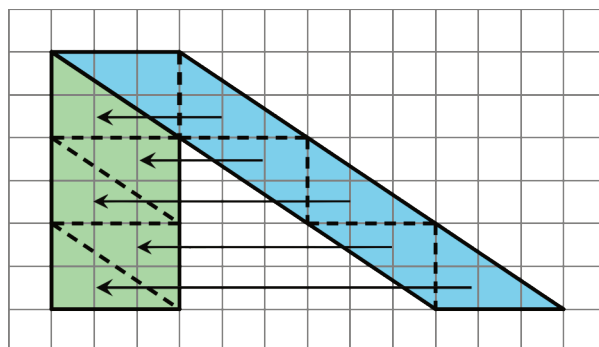


- We can enclose the parallelogram and then subtract the area of the two triangles in the corner.



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

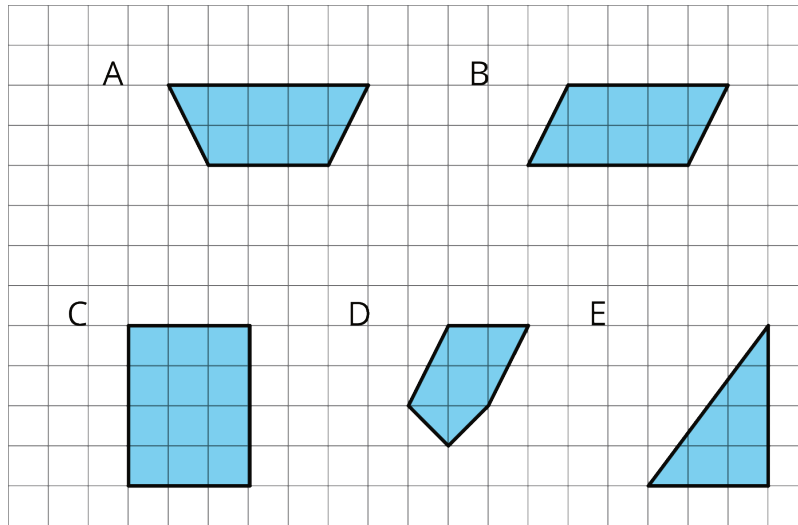
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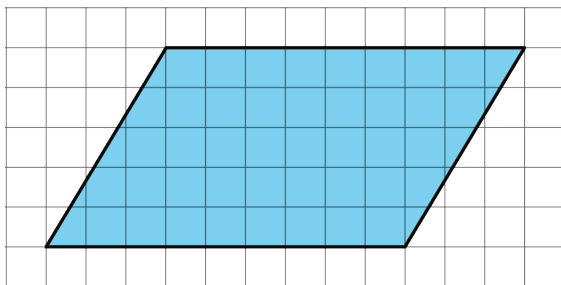
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Unit 1, Lesson 4: Parallelograms

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

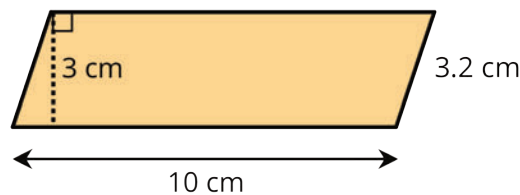


2. a. Decompose and rearrange this parallelogram to make a rectangle.



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

3. Find the area of the parallelogram.

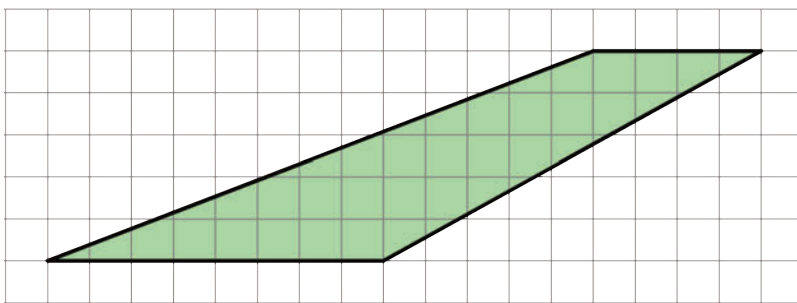


4. Explain why this quadrilateral is *not* a parallelogram.

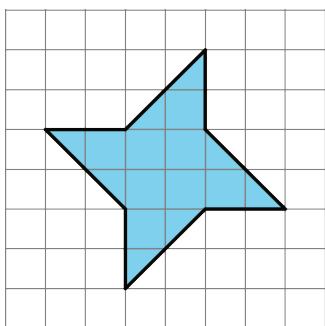
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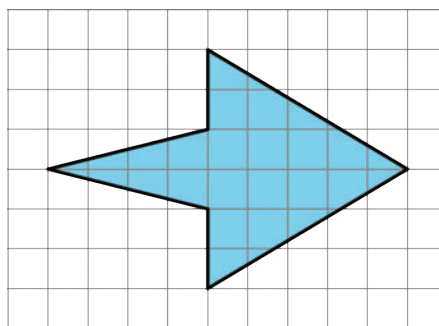
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5. Find the area of each shape. Show your reasoning.



(from Unit 1, Lesson 3)



6. Find the areas of the rectangles with the following side lengths.

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

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

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

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

(from Unit 1, Lesson 1)