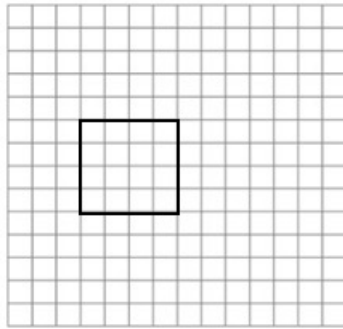


Perimeter and Area

Perimeter

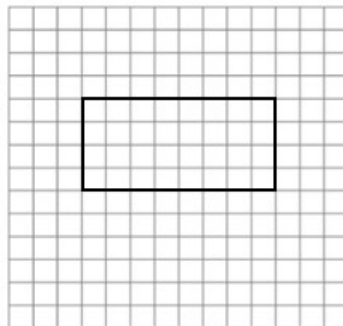
Perimeter: the total distance around the outside edge of a figure.

Example: How can we find the perimeter? We can add all the sides of a figure. The perimeter of the square below is $4+4+4+4 = 16$.



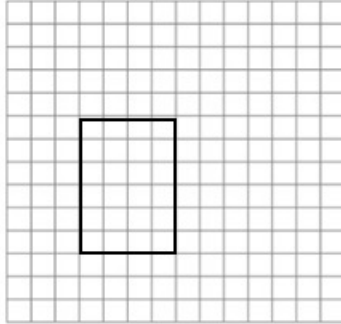
Find the perimeters of the shapes below.

1. What is the perimeter?



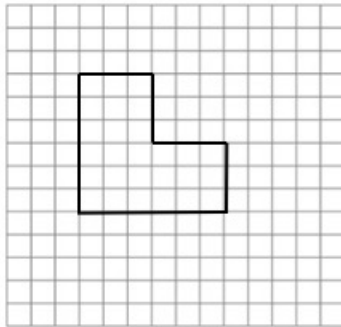
$$8+8+4+4 = 24$$

2. What is the perimeter?



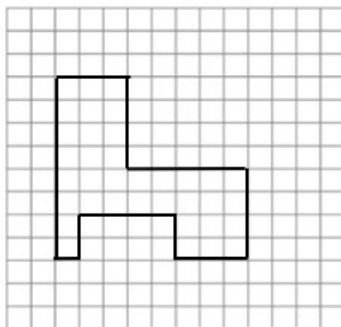
$$4+4+6+6=20$$

3. What is the perimeter?



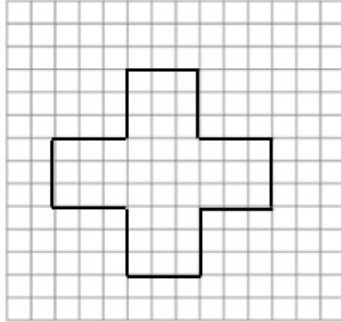
$$3+3+3+3+6+6=24$$

4. What is the perimeter?



$$3+4+5+4+3+2+4+2+1+8=36$$

5. What is the perimeter?



$$3+3+3+3+3+3+3+3+3+3+3+3=36$$

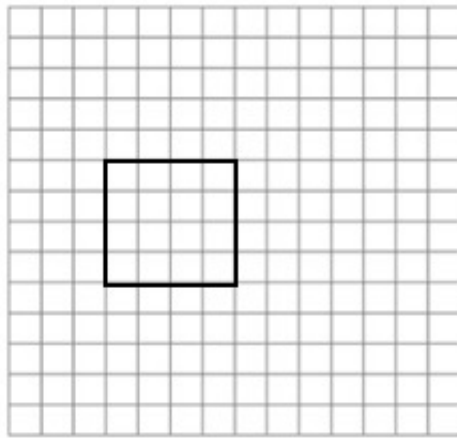
6. What was your strategy for finding the perimeter? Explain what you did in words.

Strategy: find the side lengths and add

Area

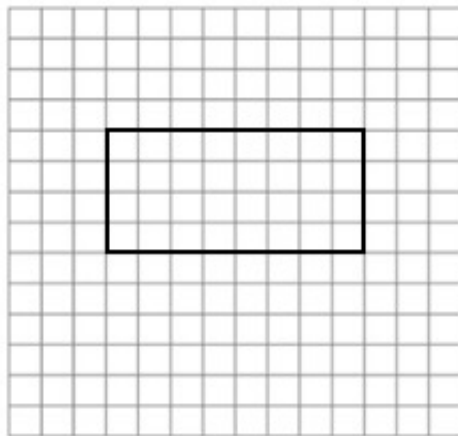
Area: The amount of space inside the boundary of a 2-dimensional shape.

Example: What is the area of the following shape? The area can be found by counting the number of squares inside the big square.



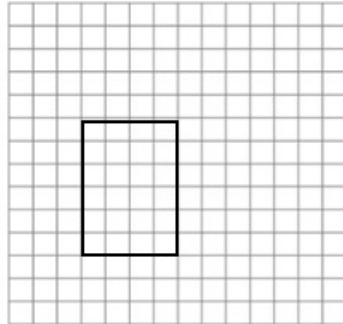
16

1. What is the area of the following shape?



32

2. What is the area of the following shape?

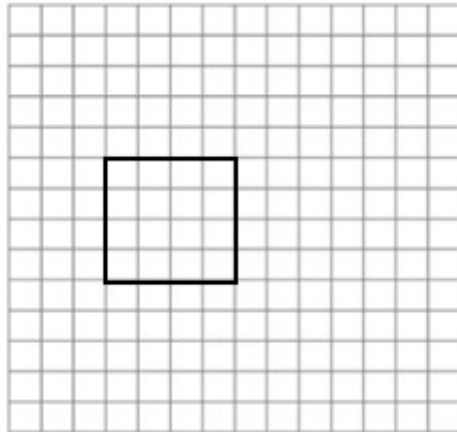


24

We can also find the area of the rectangles by using the following equation.

$$\text{Area} = \text{length} \times \text{width}$$

Example: length = 4, width = 4
area = length \times width = 16

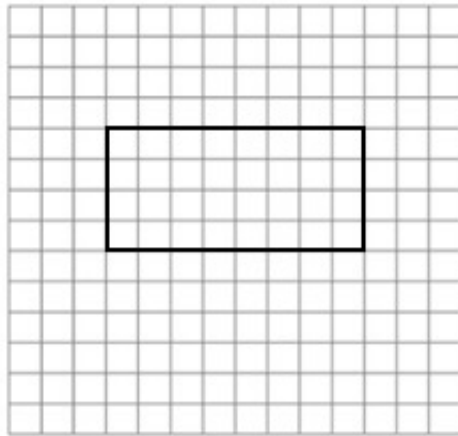


1. Use multiplication to find the following rectangle's area.

$$\text{Length} = 8$$

$$\text{Width} = 4$$

$$\text{Area} = \text{length} \times \text{width} = 32$$

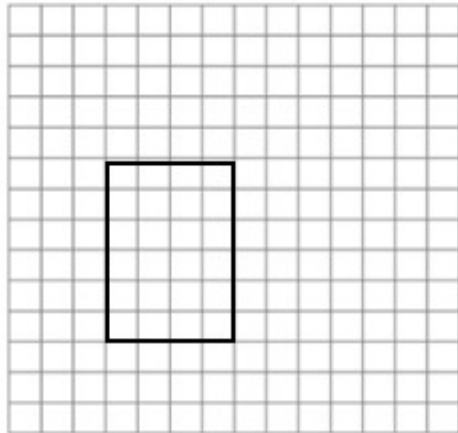


2. What is the area of the following shape?

$$\text{Length} = 6$$

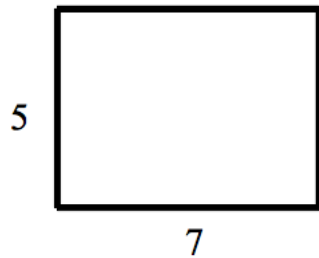
$$\text{Width} = 4$$

$$\text{Area} = \text{length} \times \text{width} = 24$$

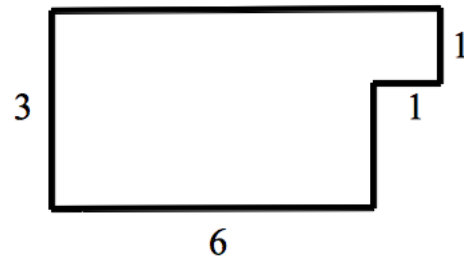


Shapes made out of rectangles

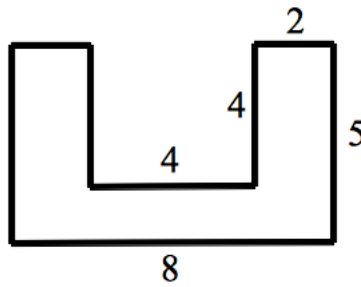
1. Find the area for the following shapes. (Hint: First find all the side lengths you need to compute the area similar to what you did with the perimeter.)



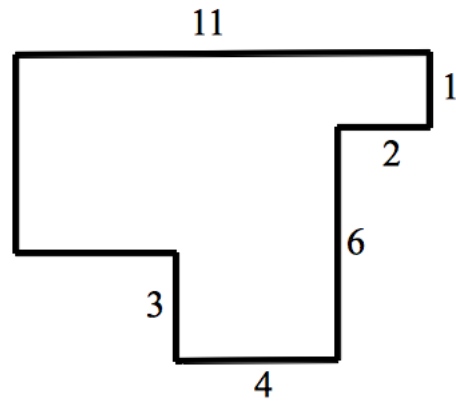
Area= 35



Area= 19

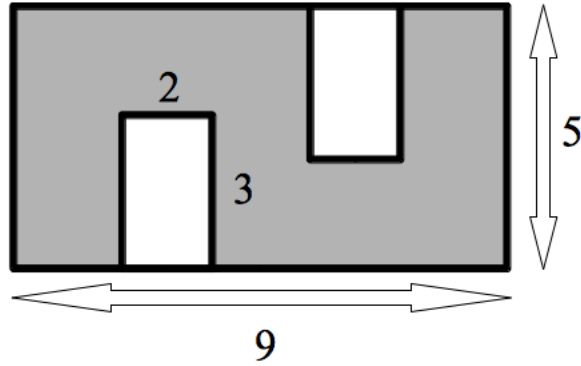


Area= 24



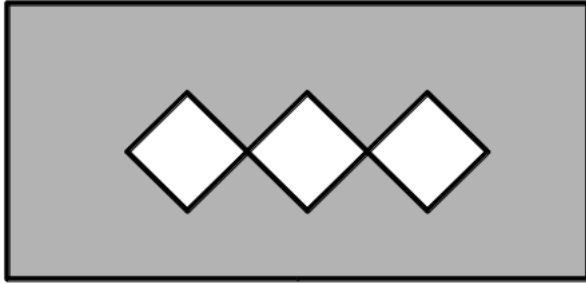
Area= 50

2. The width of the rectangle below is 5 cm, the length of the rectangle is 9 cm, and the gaps are 3 cm by 2 cm. Calculate the area of the shaded region.



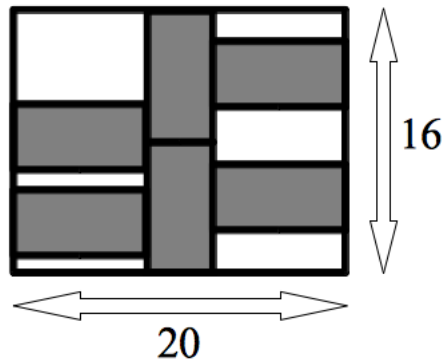
$$\text{Area} = 45 - 2(6) = 33$$

3. Three squares of side length 4cm are cut out from a rectangle of size 6 cm by 9 cm. What is the area of the shaded region? Start by labeling all the sides.



$$\text{Area} = 6(9) - (4)(4)(3) = 6$$

4. The figure below shows a large rectangle that has a length of 30m and a width of 16m.



- (a) What is the width and length of each shaded rectangle?

$$\text{Length} = 8$$

$$\text{Width} = 4$$

- (b) What is the perimeter of each shaded rectangle?

$$\text{Perimeter} = 8(2) + 4(2) = 24$$

- (c) What is the area of each shaded rectangle?

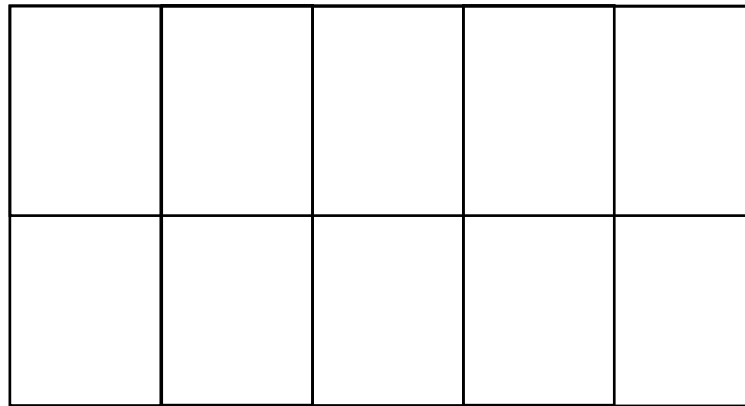
$$\text{Area} = 8(4) = 32$$

- (d) What is the area of the big rectangle?

$$\text{Area} = 20(16) = 320$$

- (e) If you laid the shaded rectangles next to each other with no spaces, what is the maximum amount of shaded rectangles you could fit in the big white rectangle? Make a picture:

10 rectangles can fit



16

20

CHALLENGE Qs:

f) What is the maximum number of squares with sides of 4cm that could fit into the large rectangle?

20

g) What is the maximum number of squares with sides of 2cm that could fit into the large rectangle?

80

h) What is the maximum number of squares with sides of 8cm that could fit into the large rectangle?

Finding the area of parallelograms

You can find the area of a rectangle by the following familiar formula: $A = \textit{width} \times \textit{length}$. However, another way to name the vertical side, is by height as this does show the height of your rectangle. Thus, modifying the formula to $A = \textit{width} \times \textit{height}$.



The following shape is a parallelogram that we are familiar with:

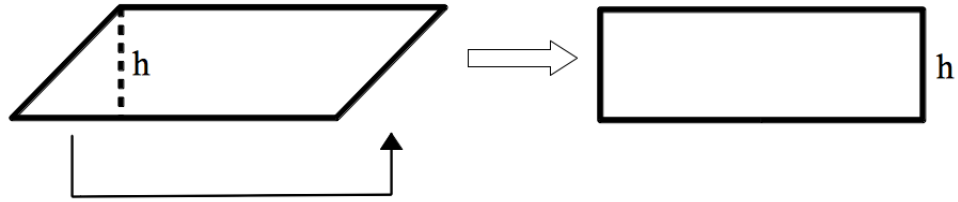


Finding the area of a parallelogram is very similar to finding the area of a rectangle as long as you are given the height of the parallelogram. This height is NOT represented by the parallel sides at an angle. The height is the distance between the two parallel horizontal sides, as seen below:



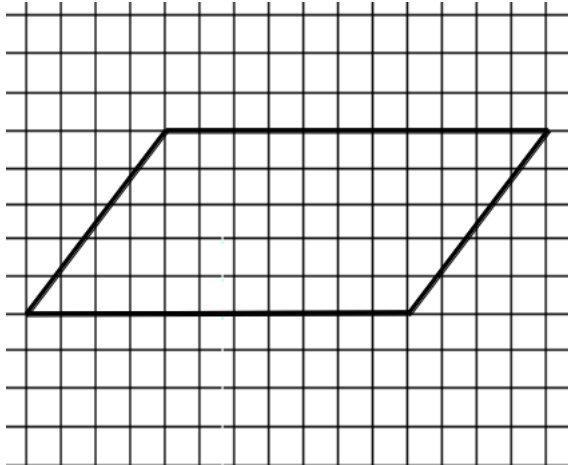
If you cut off the triangle shaded and move it to the other

side of the parallelogram, you now have made a rectangle:



Thus, the area of a parallelogram is $A = \textit{width} \times \textit{height}$.

1. Look at the parallelogram on the grid below:



- (a) What is the height of the parallelogram?

5 units

- (b) What is the length of the base?

11 units

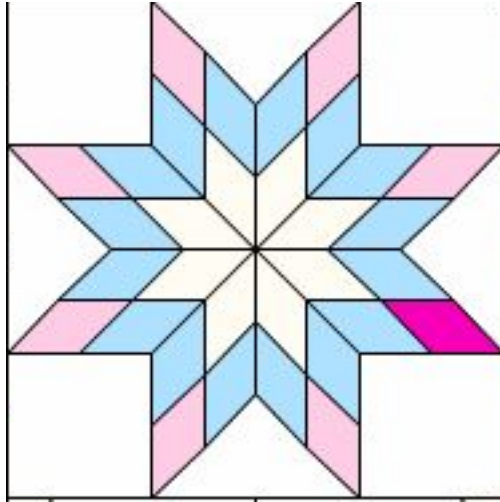
- (c) What is the area?

55 units²

2. On the grid paper given to you, draw several possible rectangles with area 8. How many different rectangles with area 8 can you draw? (Assume that the sides of the rectangles are parallel to the grid lines and that the side lengths are whole numbers.)

2 different (1x8, 2x4)

3. Below is a flower made out of equal sized parallelograms:



The following information is given:

- the height of one parallelogram is 3 inches
- the width of 2 parallelograms side by side is 8 inches.

- (a) What is the width of one parallelogram?

4

- (b) What is the area of the one parallelogram

$$4(3)=12$$

- (c) If you notice, each flower petal makes a bigger parallelogram, how many parallelogram petals are there?

4

(d) How many small parallelograms make up the flower?

32

(e) What is the area of the entire flower?

$32(12)=384$