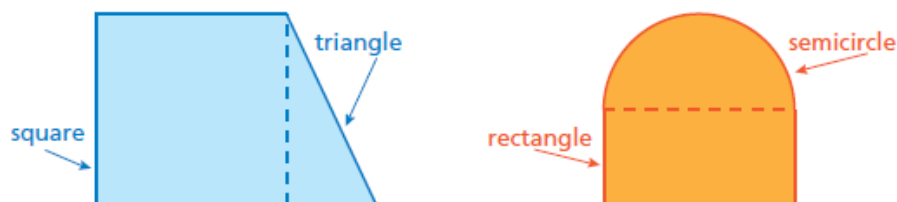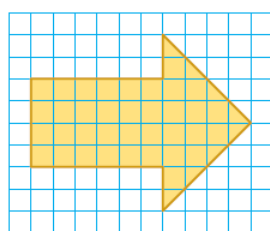# Indicator 13 Class Notes by Mrs. Joshi

Drawing Polygons and Length of the Side

A **composite figure** is made up of triangles, squares, rectangles, semicircles, and other two-dimensional figures. Here are two examples.

To find the perimeter of a composite figure, find the distance around the figure.
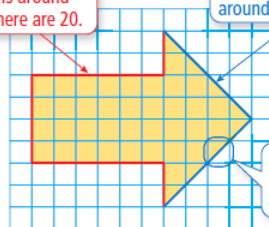
EXAMPLE 1 Finding a Perimeter Using Grid Paper

Each square on the grid paper is 1 square inch. Estimate the perimeter of the arrow.

Count the number of grid square lengths around the arrow. There are 20.

Count the number of diagonal lengths around the arrow. There are 8.
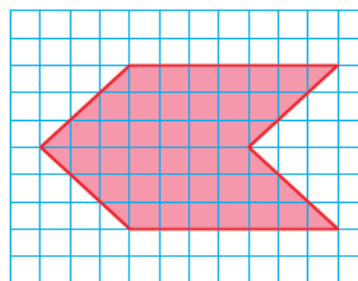
1 in.
1 in.
Estimate the diagonal length to be 1.5 in.

Length of 20 grid square lengths: $20 \times 1 = 20$ inches

Length of 8 diagonal lengths: $8 \times 1.5 = 12$ inches

The perimeter is about $20 + 12 = 32$ inches.

On Your Own

1. Each square on the grid paper is 1 square foot. Estimate the perimeter of the red figure.

2. Measure the diagonal of a square whose area is exactly one square foot. Is the diagonal length closer to 1.5 feet or 1.4 feet? Explain.

Plot a quadrilateral with vertices A(3, 2), B(8, 2), C(8, 6), D(3, 6) on the coordinate plane. Then find the area of the quadrilateral.
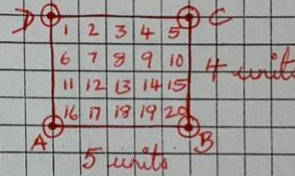
Mrs. Joshi

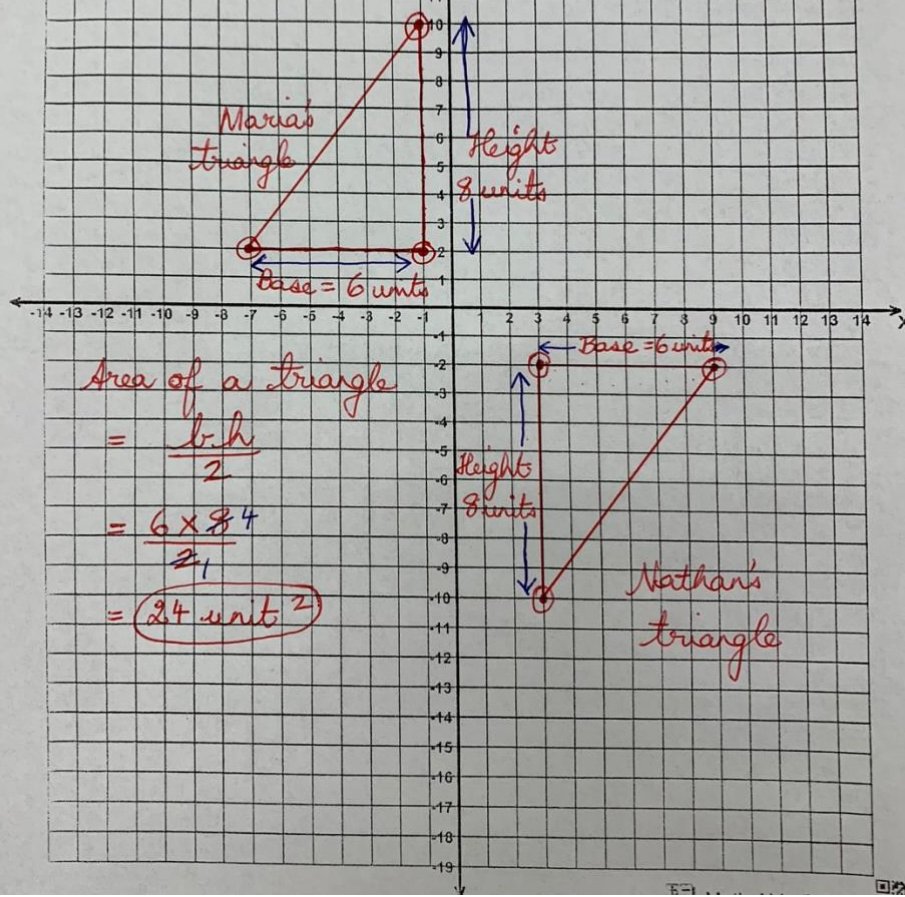Area of a rectangle

= length × width

= 5 × 4

= 20 units²

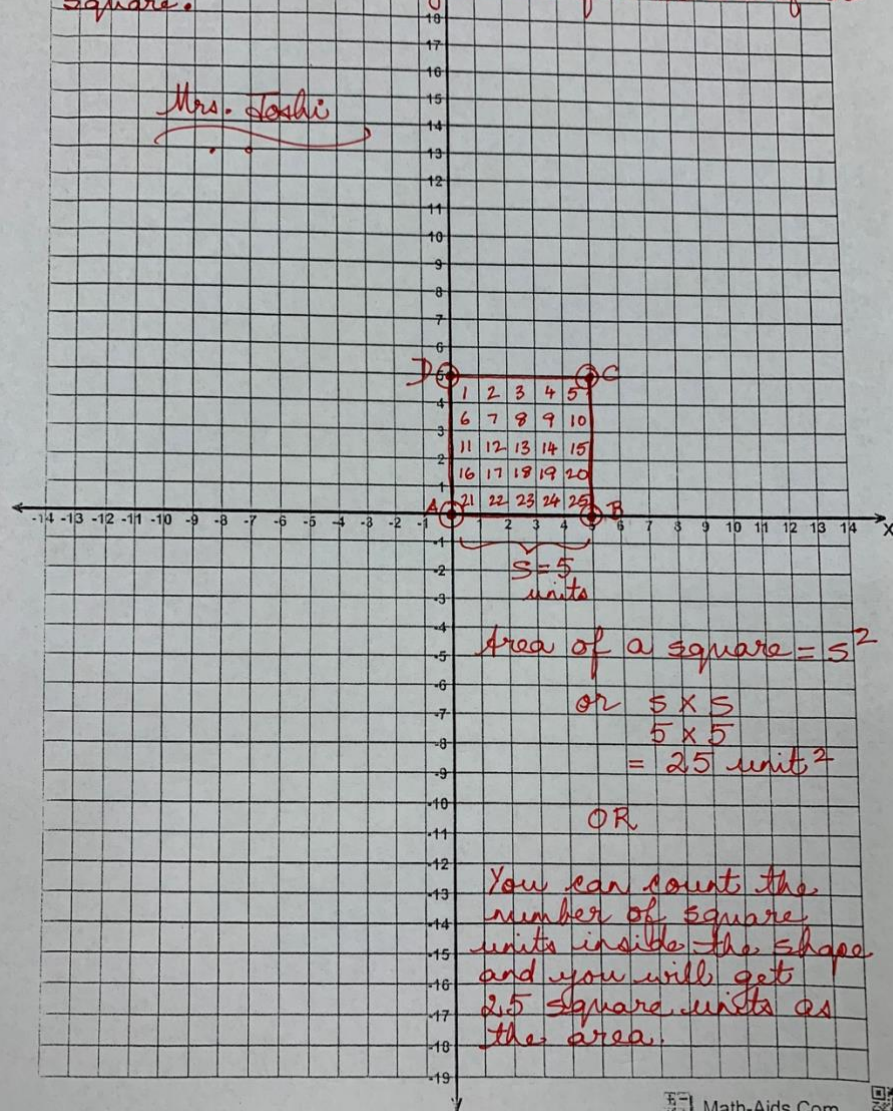You may also count the number of square units inside the rectangle and you will get 20 square units as your area.

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Maria created a triangle on a coordinate plane using coordinates $(-1, 2)$, $(-1, 10)$, $(-7, 2)$. Nathan created a triangle on the same coordinate plane using coordinates $(3, -2)$, $(9, -2)$, $(3, -10)$. Do their triangles have the same area? Explain why.

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Maria's triangle

Height 8 units

base = 6 units

Base = 6 units

Height 8 units

Nathan's triangle

Area of a triangle

$$= \frac{b \cdot h}{2}$$

$$= \frac{6 \times 8^4}{2_1}$$

$$= 24 \text{ unit}^2$$

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Plot a square with vertices A(0,0), B(5,0), C(5,5), and D(0,5) on the coordinate grid. Then find the area of the square.

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S = 5 units

Area of a square = S^2

or 5 × 5
    5 × 5
    = 25 unit^2

OR

You can count the number of square units inside the shape and you will get 25 square units as the area.

Math-Aids.Com
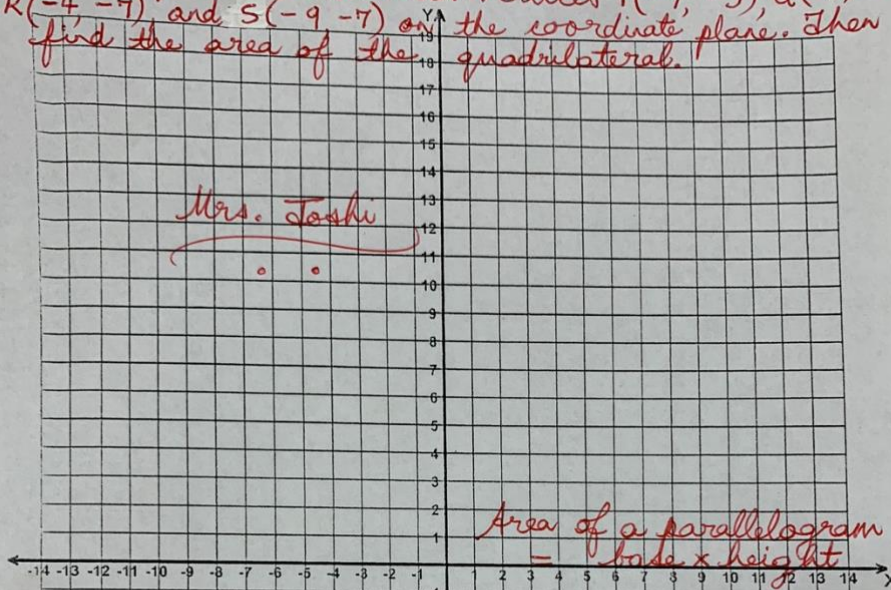
Indicator 13 Class Notes by Mrs. Joshi

Plot a quadrilateral with vertices $P(-7, -3)$, $Q(-2, -3)$, $R(-4, -7)$ and $S(-9, -7)$ on the coordinate plane. Then find the area of the quadrilateral.

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Area of a parallelogram
= base × height

$A = bh$
= 5 × 4
= 20 unit²

ht.
4 units

5 units

base

<u>OR</u> You may count the square units inside the parallelogram. There are 16 full squares and 8 half squares which 2 half squares = 1 full square. ▱

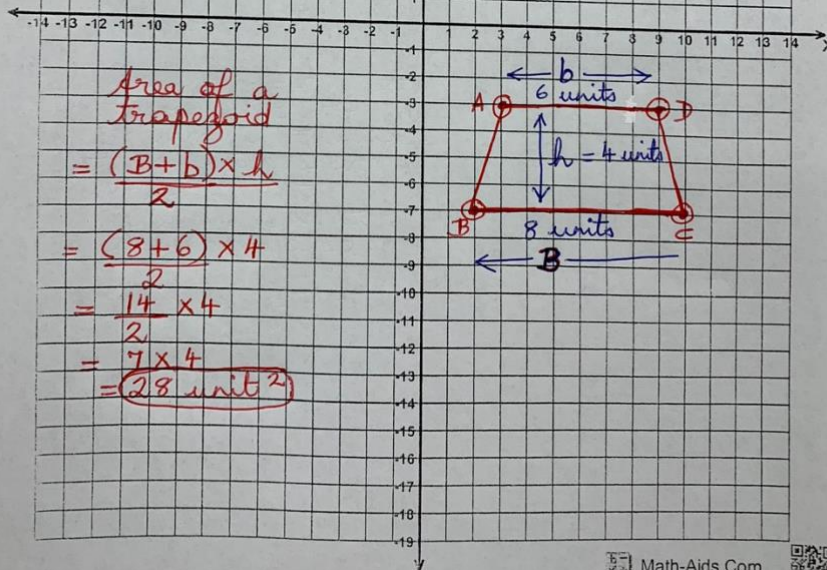16 full + 8 half =
16 full + 4 full = 20 square units

Plot a quadrilateral with vertices A (3,-3), B(2,-7), c(9,-3), D(10,-7) on the coordinate plane. Then find the area of the quadrilateral.

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Area of a trapezoid

$$= \frac{(B+b) \times h}{2}$$

$$= \frac{(8+6) \times 4}{2}$$

$$= \frac{14}{2} \times 4$$

$$= 7 \times 4$$

$$= 28 \ unit^2$$

Math-Aids.Com

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EXAMPLE **Find Perimeter of a Composite Figure**

2 **Find the perimeter of the figure.**

Add all of the distances around the composite figure.

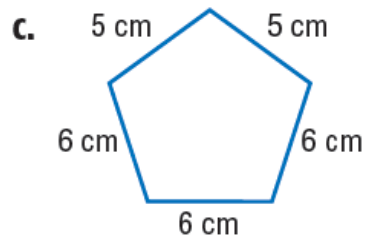1.2 m   4 m   1 m   1.2 m   4 m

$P = 1.2 + 1.2 + 4 + 1 + 4$ Sum of all sides

$P = 11.4$ m   Add.

The perimeter is 11.4 meters.
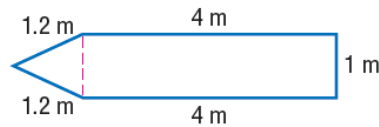
CHECK Your Progress

Find the perimeter of each figure.

b.

10.5 ft   5.5 ft   5.5 ft   5.5 ft   5.5 ft   10.5 ft

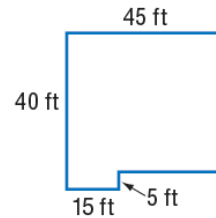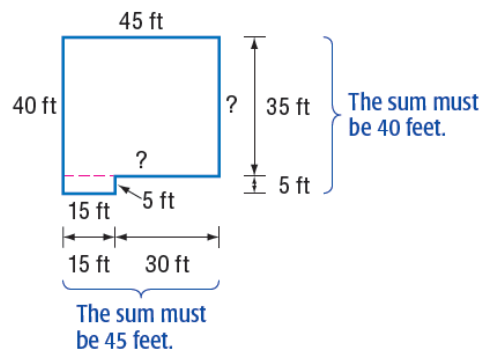**c.**

5 cm   5 cm   6 cm   6 cm   6 cm
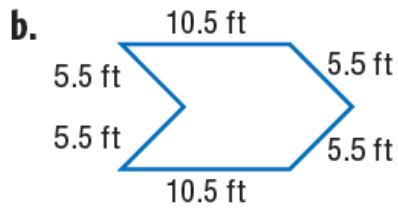
Indicator 13 Class Notes by Mrs. Joshi

EXAMPLE **Find Missing Measures to Find Perimeter**
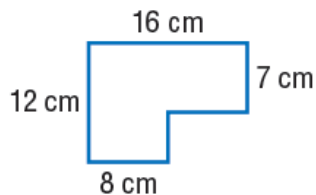
4 **Find the perimeter of the figure.**

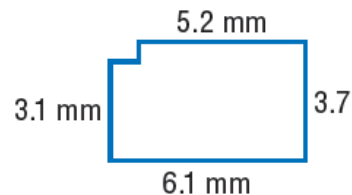Find the unknown lengths by breaking the figure into two shapes.

45 ft

40 ft

? | 35 ft — The sum must be 40 feet.

?

15 ft ↖5 ft ± 5 ft

15 ft 30 ft

The sum must be 45 feet.

45 ft

40 ft

15 ft ↖5 ft

So, the perimeter is $45 + 40 + 15 + 5 + 30 + 35$ or 170 feet.

CHECK Your Progress

e.
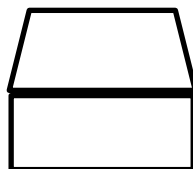
16 cm

7 cm

12 cm

8 cm

f.

5.2 mm

3.1 mm

3.7

6.1 mm

Drawing Polygons and Length of the Side

1. Draw a composite figure formed by a trapezoid and a rectangle.

Indicator 13 Class Notes by Mrs. Joshi

2. Draw a parallelogram. Suppose you can't remember the formula for the area of a parallelogram. Explain how you can think of the parallelogram as a composite figure to find its area.

You can think a parallelogram as a rectangle and two composite triangles.
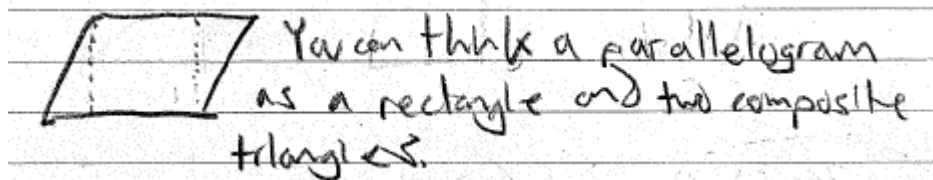
3. Is the perimeter of a composite figure *greater than, less than,* or *equal to* the sum of the perimeters of each figure separately? Explain.

The composite figure's perimeter will be less than each figure indivisually, considering that a composite figure has sides inside the figure (shared sides), each figure seperately will include the lengths of these previously excluded sides, enlargiy the perimeter.

side insibe figure

sibes not oulgh included