

Section 4-1: Area of Parallelograms- Teacher Notes

Objective: Students will be able to find the area of a parallelogram.

Vocabulary:

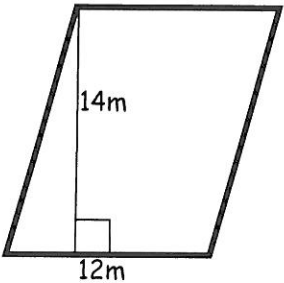
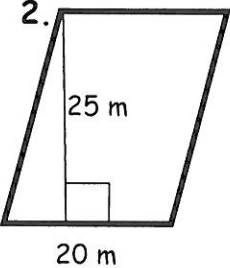
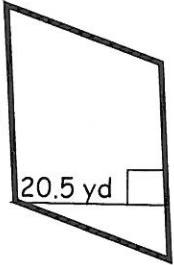
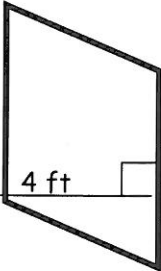
- 1.) Area - the amount of surface a shape covers
- 2.) Polygon - a shape with three or more sides
- 3.) Parallelogram - a four-sided figure with two pairs of parallel sides. The opposite sides of a parallelogram are parallel

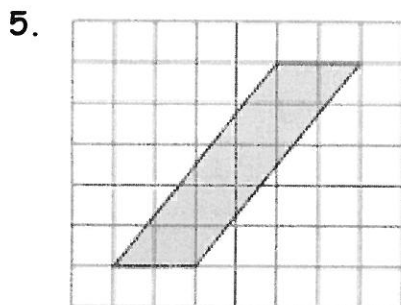
Formula:

Area of a parallelogram: $A = bh$

Examples

Find the area of each parallelogram

<p>1.</p>  <p>14m</p> <p>12m</p>	<p>2.</p>  <p>25 m</p> <p>20 m</p> <p>$A = bh$ $A = 25 \times 20$ $A = 500 \text{ m}$</p>
<p>3.</p>  <p>30 yd</p> <p>20.5 yd</p>	<p>4.</p>  <p>$8 \frac{1}{2} \text{ ft}$</p> <p>4 ft</p> <p>$A = bh$ $A = 8 \frac{1}{2} \times 4$ $A = 34 \text{ ft}$</p>



$$A = bh$$
$$A = 2 \times 5$$
$$A = 10$$

Section 4-2: Area of Triangles- Teacher Notes

Objective: Students will be able to find the area of a Triangle.

Vocabulary:

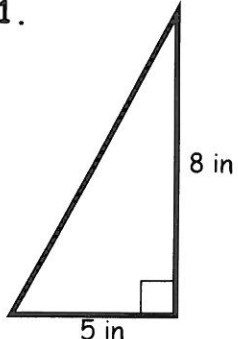
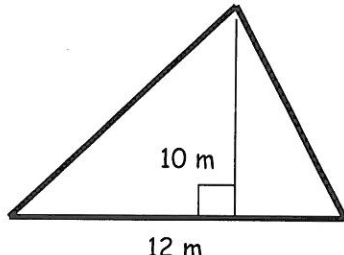
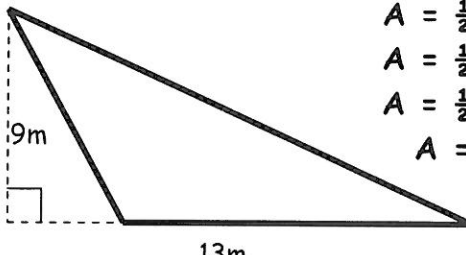
1.) Area - the amount of surface a shape covers

Formula:

Area of a triangle: $A = \frac{1}{2} bh$

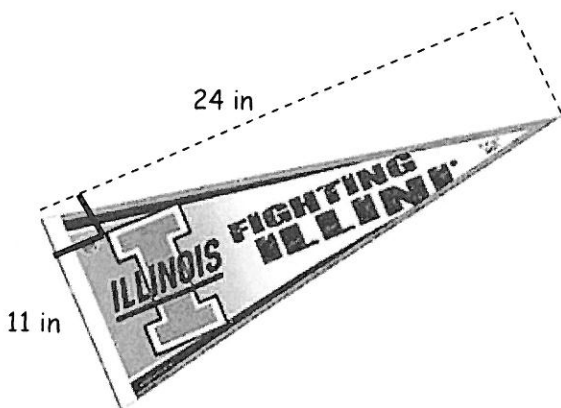
Examples

Find the area of each triangle- first identify base (b) and height (h)

<p>1.</p>  <p>8 in</p> <p>5 in</p>	<p>2.</p> $A = \frac{1}{2} bh$ $A = \frac{1}{2} 5 \times 8$ $A = \frac{1}{2} \times 40$ $A = 20 \text{ in}$
<p>3.</p>  <p>10 m</p> <p>12 m</p>	$A = \frac{1}{2} bh$ $A = \frac{1}{2} \times 10 \times 12$ $A = \frac{1}{2} \times 120$ $A = 60 \text{ m}$
<p>4.</p>  <p>9m</p> <p>13m</p>	$A = \frac{1}{2} bh$ $A = \frac{1}{2} \times 9 \times 14$ $A = \frac{1}{2} \times 126$ $A = 63 \text{ m}$

5. Find the Area of the University of Illinois pennant:

$$A = \frac{1}{2} bh$$
$$A = \frac{1}{2} \times 24 \times 11$$
$$A = \frac{1}{2} \times 264 = 132 \text{ in}$$



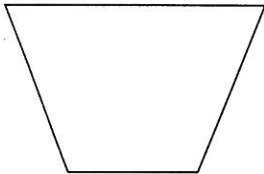
Section 4-3: Area of Trapezoids- Teacher Notes

Objective: Students will be able to find the area of a trapezoid.

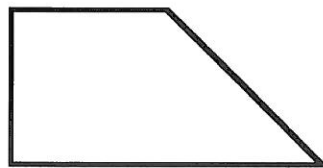
Vocabulary:

- 1.) Area - the amount of surface a shape covers
- 2.) Trapezoid - a four-sided figure with one pair of parallel sides.
The parallel sides are the bases: base 1 (b_1) and base 2 (b_2)

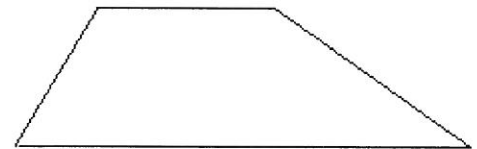
Isosceles trapezoid



Right trapezoid



Scalene trapezoid

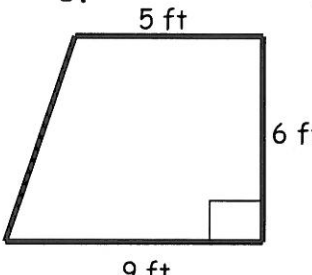
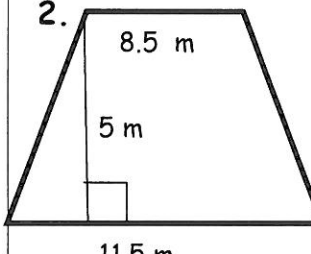
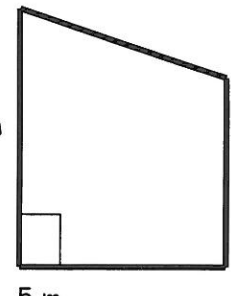
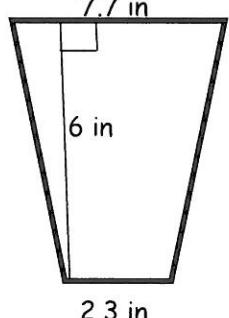


Formula:

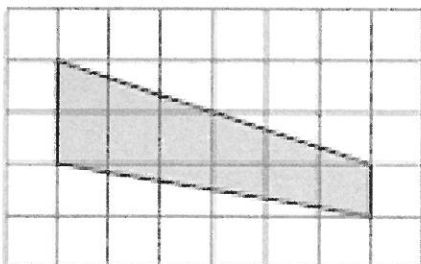
Area of a trapezoid:

$$A = \frac{1}{2} (b_1 + b_2) h$$

Examples: Find the area of each trapezoid - first identify the b_1 , b_2 and h

<p>1.</p>  <p style="text-align: center;">$b_1=9; b_2=5; h=6$</p> $A = \frac{1}{2} (b_1 + b_2) h$ $A = \frac{1}{2} (9+5) \times 6$ $A = \frac{1}{2} \times 14 \times 6$ $A = \frac{1}{2} \times 84$ $A = 42 \text{ ft}^2$	<p>2.</p>  $A = \frac{1}{2} (b_1 + b_2) h$ $A = \frac{1}{2} (8.5+11.5) \times 5$ $A = \frac{1}{2} \times 20 \times 5$ $A = \frac{1}{2} \times 40$ $A = 20 \text{ m}^2$
<p>3.</p>  $A = \frac{1}{2} (b_1 + b_2) h$ $A = \frac{1}{2} (8+4) \times 5$ $A = \frac{1}{2} \times 12 \times 5$ $A = \frac{1}{2} \times 60$ $A = 30 \text{ m}^2$	<p>4.</p>  $A = \frac{1}{2} (b_1 + b_2) h$ $A = \frac{1}{2} (2.3+7.7) \times 6$ $A = \frac{1}{2} \times 10 \times 6$ $A = \frac{1}{2} \times 60$ $A = 30 \text{ in}^2$

5.



$$A = \frac{1}{2} (b_1 + b_2) h$$

$$A = \frac{1}{2} (1 + 2) \times 6$$

$$A = \frac{1}{2} \times 3 \times 6$$

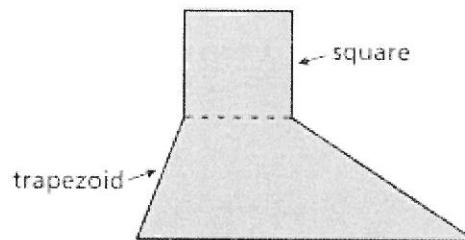
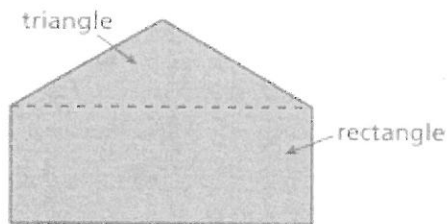
$$A = \frac{1}{2} \times 18 = 9 \text{ units}^2$$

Section 4-3Ext: Area of Composite Figures- Teacher Notes

Objective: Students will be able to find the area of composite figures.

Vocabulary:

- 1.) Area - the amount of surface a shape covers
- 2.) Composite figure - a figure made up of two or more triangles, squares, rectangles or other two-dimensional figures.

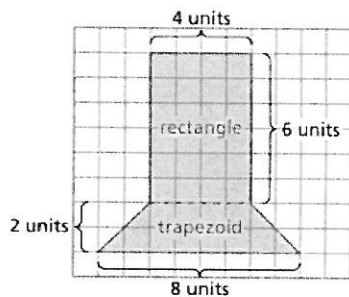


Steps for finding the area of a composite figure:

- 1.) Separate the figure into shapes you know how to find
- 2.) Label the base and height for all figures
- 3.) Calculate the area of each figure
- 4.) Add all the areas together

Examples:

1.)



<i>Area of Rectangle</i>	<i>Area of Trapezoid</i>
$A = \ell w$	$A = \frac{1}{2}h(b_1 + b_2)$
$= 6(4)$	$= \frac{1}{2}(2)(4 + 8)$
$= 24$	$= 12$

∴ So, the area of the purple figure is $24 + 12 = 36$ square units.

You can check the reasonableness by counting unit squares

2.)

Area of trapezoid #1

$$A_{\text{trap1}} = \frac{1}{2} (b_1 + b_2) \times h$$

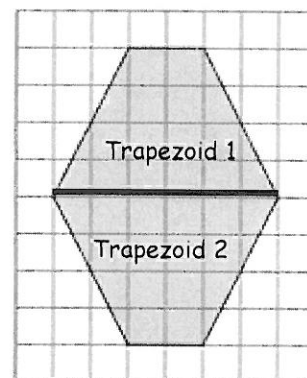
$$A_{\text{trap1}} = \frac{1}{2} (2 + 6) \times 4$$

$$A_{\text{trap1}} = 16 \text{ units}^2$$

Since there are two congruent trapezoids, the area of the composite figure is:

$$2 \times A_{\text{trap1}}$$

$$2 \times 16 = 32 \text{ units}^2$$



3.)

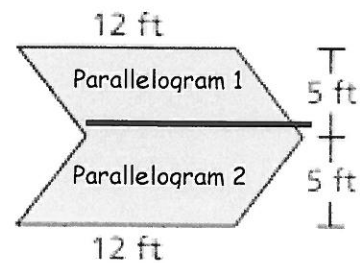
Area of parallelogram #1

$$A_{\text{parallelogram1}} = b \times h$$

$$A_{\text{parallelogram1}} = 12 \times 5$$

$$A_{\text{parallelogram1}} = 60 \text{ ft}^2$$

Since there are two congruent parallelogram, the area of the composite figure is: $2 \times A_{\text{parallelogram1}}$
 $2 \times 60 = 120 \text{ ft}^2$



4.)

Area of parallelogram

$$A_{\text{parallelogram}} = b \times h$$

$$A_{\text{parallelogram1}} = 8 \times 11$$

$$A_{\text{parallelogram1}} = 88 \text{ cm}^2$$

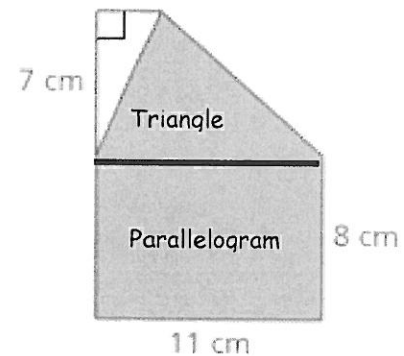
Area of triangle

$$A_{\text{tri}} = \frac{1}{2} \times b \times h$$

$$A_{\text{tri}} = \frac{1}{2} \times 11 \times 7$$

$$A_{\text{tri}} = 38.5 \text{ cm}^2$$

Area of figure = area of parallelogram + area of triangle
 $= 88 + 38.5 = 126.5 \text{ cm}^2$



5.)

Area of parallelogram

$$A_{\text{parallelogram}} = b \times h$$

$$A_{\text{parallelogram1}} = 10 \times 10$$

$$A_{\text{parallelogram1}} = 100 \text{ in}^2$$

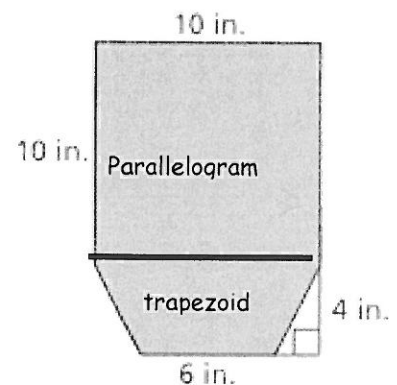
Area of trapezoid

$$A_{\text{trap}} = \frac{1}{2} (b_1 + b_2) \times h$$

$$A_{\text{trap}} = \frac{1}{2} (6 + 10) \times 4$$

$$A_{\text{trap}} = 32 \text{ in}^2$$

Area of figure = area of parallelogram + area of trapezoid
 $= 100 + 32 = 132 \text{ in}^2$



Section 4-4 Polygons on the Coordinate Plane- Teacher Notes

Objective: Students will be able to draw polygons in the coordinate plane and find the length of the sides of the polygons

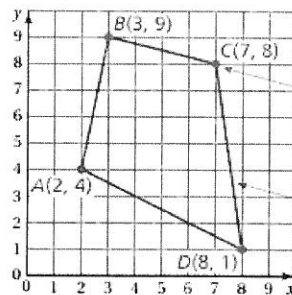
Vocabulary:

- 1.) Area - the amount of surface a shape covers
- 2.) Polygon - a shape with three or more sides
- 3.) Perimeter - the distance around the outside of a two-dimensional shape; the sum of the sides of a polygon;
- 4.) Vertex - the point where two lines meet; The plural is vertices.

Draw a Polygon on a Coordinate Plane

- 1) Plot and label the vertices
- 2) Connect the points to form the shape

Vertices: $A(2,4)$; $B(3,9)$; $C(7,8)$; $D(8,1)$



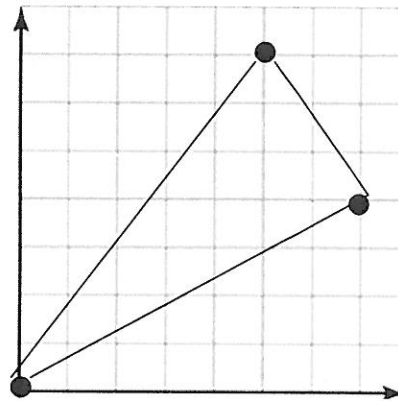
Plot and label the vertices.

Connect the points to form the quadrilateral.

Examples:

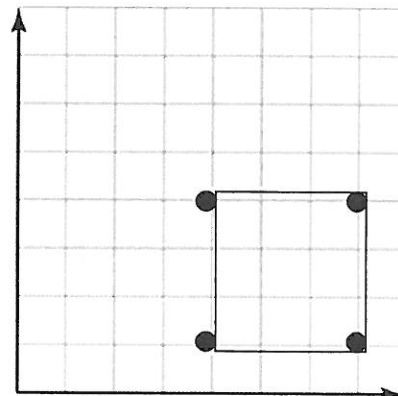
- 1) Draw the polygon with the vertices in a coordinate plane:

Vertices: $A(0,0)$; $B(5,7)$; $C(7,4)$



- 2) Draw the polygon with the vertices in a coordinate plane:

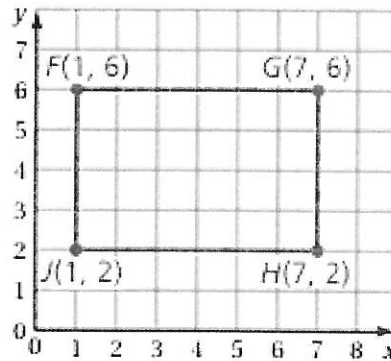
Vertices: $W(4,4)$; $X(7,4)$; $Y(7,1)$; $Z(4,1)$



Section 4-4 Polygons on the Coordinate Plane- Teacher Notes (page2)

Finding a Perimeter and Area of a Rectangle

- 1) Plot and label the vertices
- 2) Connect the points to form the shape
- 3) The length of the base is the difference in the x-coordinates
- 4) The length of the height is the difference in the y-coordinates



$$\text{Length of base} = 7 - 1 = 6 \text{ units}$$

$$\text{Length of height} = 6 - 2 = 4 \text{ units}$$

$$\text{Perimeter} = 6 + 4 + 6 + 4 = 20 \text{ units}$$

$$\text{Area} = bh = 6 \times 4 = 24 \text{ units}^2$$

Examples:

3. The vertices of a rectangle are J(2,7), K(4,7), L(4,1.5) and M(2,1.5)

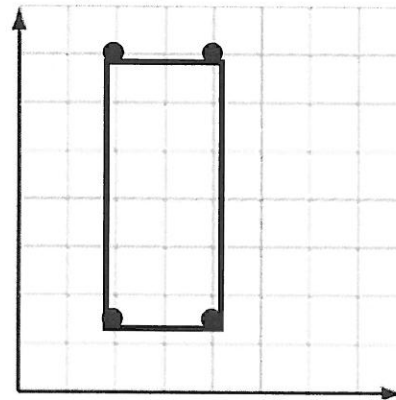
Find the perimeter and area of the shape.

$$\text{Length of base} = 4 - 2 = 2 \text{ units}$$

$$\text{Length of height} = 7 - 1.5 = 5.5 \text{ units}$$

$$\text{Perimeter} = 2 + 2 + 5.5 + 5.5 = 15 \text{ units}$$

$$\text{Area} = bh = 2 \times 5.5 = 11 \text{ units}^2$$



4. In a grid of the exhibits at a zoo, the vertices of the giraffe exhibit are E(0,80), F(60,80), G(70,30), and H(0,30). The coordinates are measured in feet. What is the area of the giraffe exhibit?

$$b_1 = 60 - 0 = 60$$

$$b_2 = 70 - 0 = 70$$

$$h = 80 - 30 = 50$$

$$A = \frac{1}{2} (b_1 + b_2) \times h$$

$$A = \frac{1}{2} (60 + 70) \times 50$$

$$A = \frac{1}{2} \times 130 \times 50 = 3250 \text{ ft}^2$$

