

Section 4-1: Area of Parallelograms

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

Vocabulary:

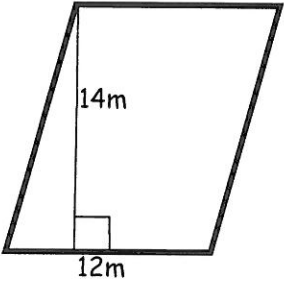
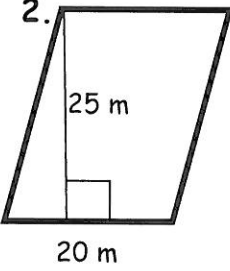
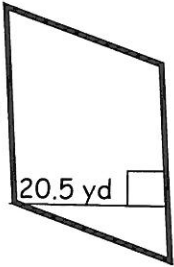
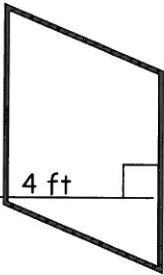
- 1.) Area - the amount of surface a shape _____.
- 2.) Polygon - a shape with _____ sides.
- 3.) Parallelogram - a four-sided figure with _____ of _____ sides.
The _____ sides of a parallelogram are parallel.

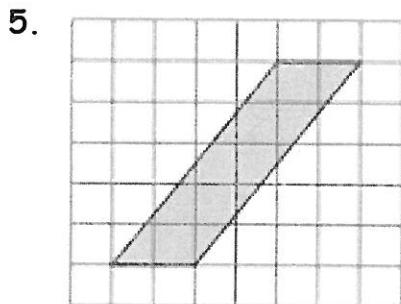
Formula:

Area of a parallelogram:

Examples

Find the area of each parallelogram

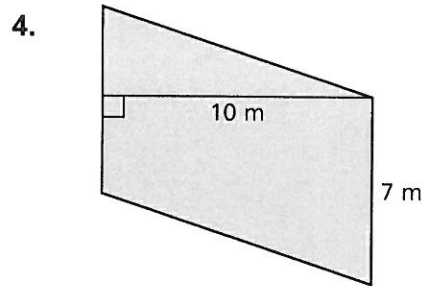
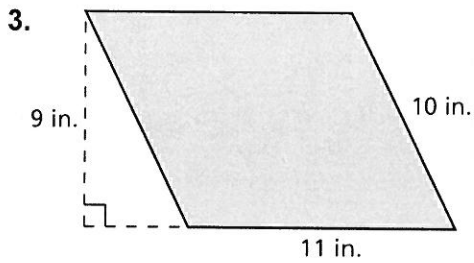
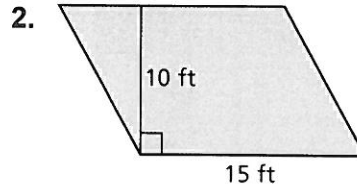
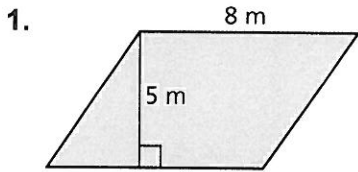
1.  $A = bh$	2.  $A = bh$
3. 	4. 



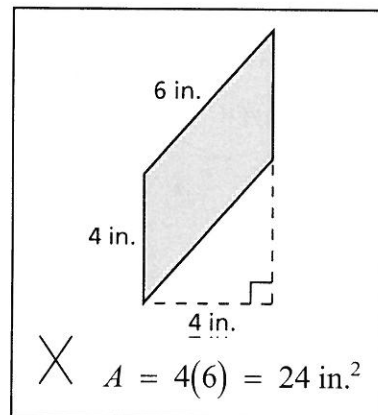
$$A = bh$$

4.1 Practice A Day One

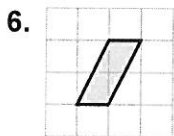
Find the area of the parallelogram.



5. Describe and correct the error in finding the area of the parallelogram.

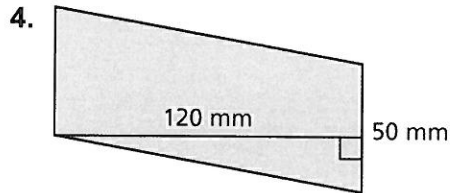
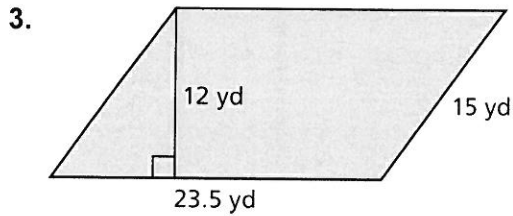
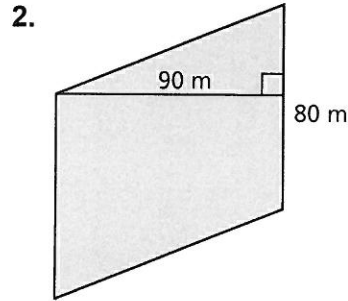
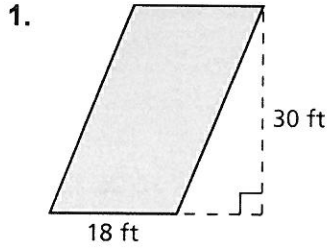


Find the area of the parallelogram.



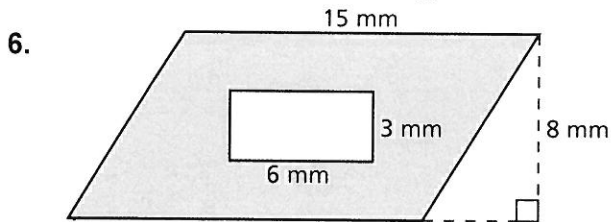
4.1 Practice B Day Two

Find the area of the parallelogram.

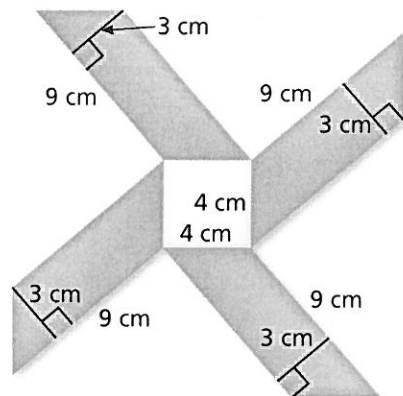


5. A billboard is in the shape of a parallelogram. The billboard has a base of 48 feet and a height of 14 feet. Find the area of the billboard.

Find the area of the shaded region.



7. The mosaic tile design consists of one square and four parallelograms. Find the area of the design.



Section 4-2: Area of Triangles- Notes

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

Vocabulary:

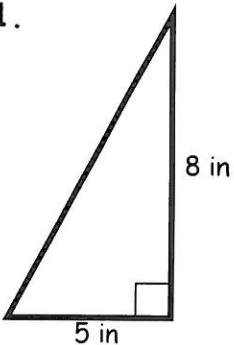
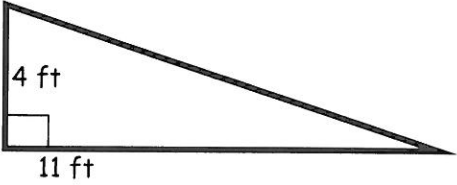
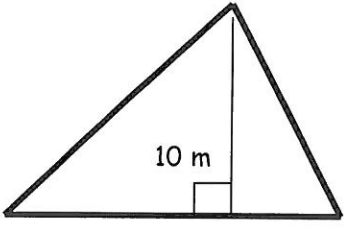
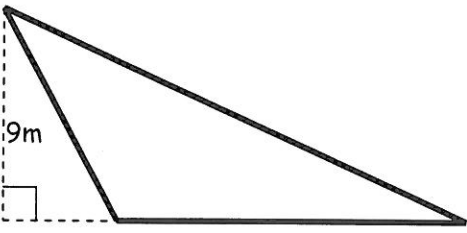
1.) Area - the amount of surface a shape _____

Formula:

Area of a triangle:

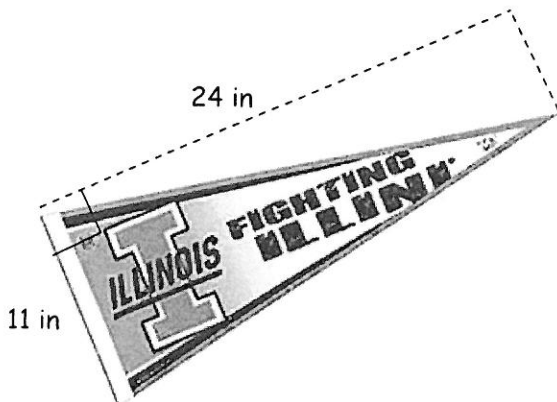
Examples

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>$A = \frac{1}{2} bh$</p>	<p>2.</p>  <p>4 ft</p> <p>11 ft</p> <p>$A = \frac{1}{2} bh$</p>
<p>3.</p>  <p>10 m</p> <p>12 m</p>	<p>4.</p>  <p>9m</p> <p>13m</p>

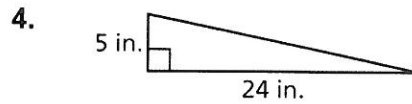
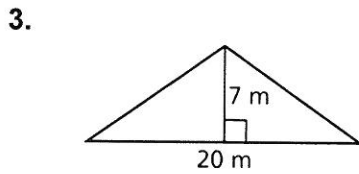
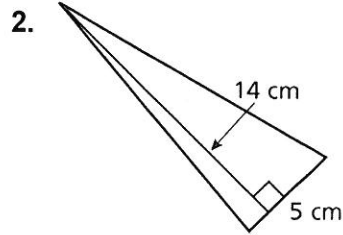
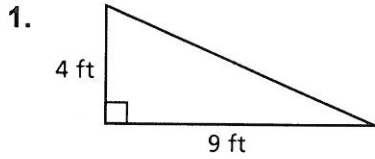
5. Find the Area of the University of Illinois pennant:

$$A = \frac{1}{2} bh$$



4.2 Practice A Day One

Find the area of the triangle.

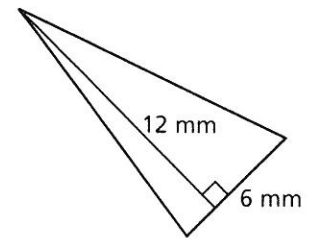
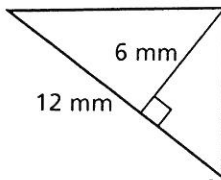


5. Describe and correct the error in finding the area of the triangle.

X

$$A = 20(9) = 180 \text{ ft}^2$$

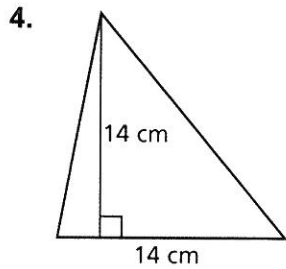
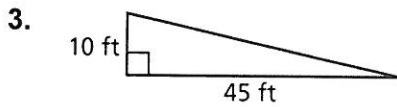
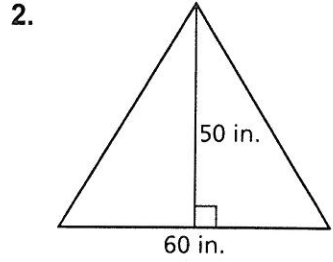
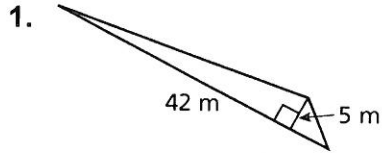
6. Find the area of each triangle. Are the areas the same? Explain.



4.2

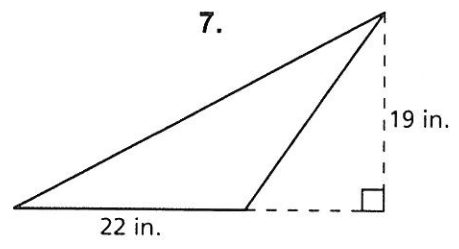
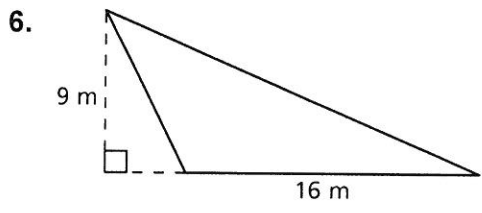
Practice B Day Two

Find the area of the triangle.

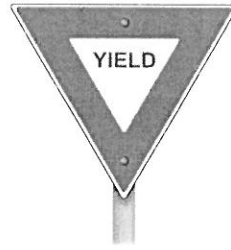


5. A sign is in the shape of a triangle with a base of 12 inches and a height of 8 inches. Find the area of the sign.

Find the area of the triangle.



8. The shaded triangle in the sign has a base of 750 millimeters and a height of 650 millimeters. The white triangle in the sign has a base of 375 millimeters and a height of 325 millimeters. Find the area of the shaded portion of the sign.



9. You live on a triangular piece of land with a base of 121 yards and a height of 80 yards. One acre of land is equal to 4840 square yards. Find the area of your piece of land in acres.

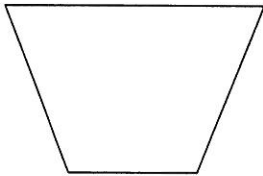
Section 4-3: Area of Trapezoids - Notes

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

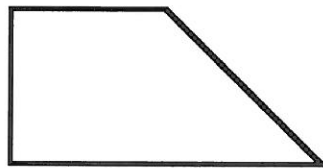
Vocabulary:

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

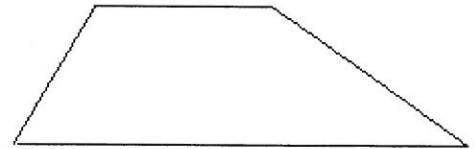
_____ trapezoid



_____ trapezoid



_____ trapezoid



Formula:

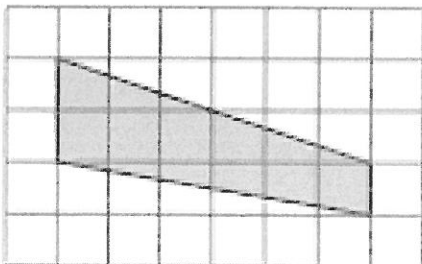
Area of a trapezoid:

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

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

<p>1.</p> <p style="text-align: center;">$b_1=9; b_2=5; h=6$ $A = \frac{1}{2} (b_1 + b_2) h$</p>	<p>2.</p> <p style="text-align: center;">$b_1= \quad b_2= \quad h=$ $A = \frac{1}{2} (b_1 + b_2) h$</p>
<p>3.</p>	<p>4.</p>

5.



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

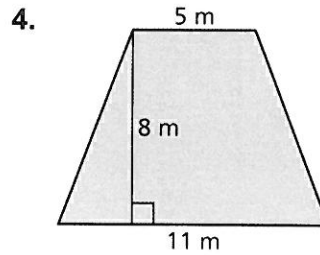
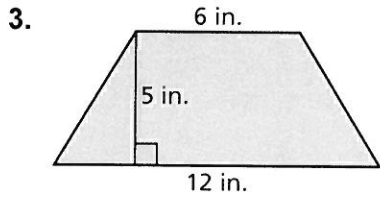
4.3

Practice A Day One

Find the area of the trapezoid.

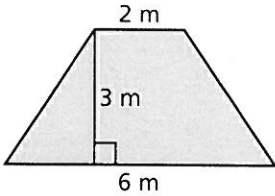
1. $b_1 = 10, b_2 = 7, h = 4$

2. $b_1 = 3, b_2 = 8, h = 6$



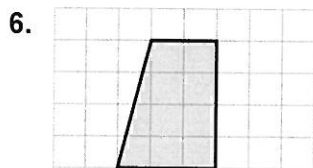
5. Describe and correct the error in finding the area of the trapezoid.

✗

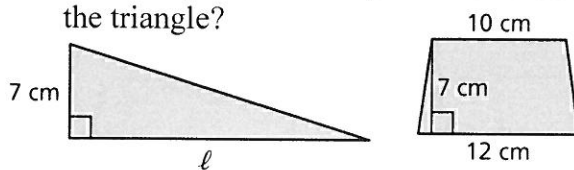


$A = \frac{1}{2}(3)(2)(6) = 18 \text{ m}^2$

Find the area of the trapezoid.



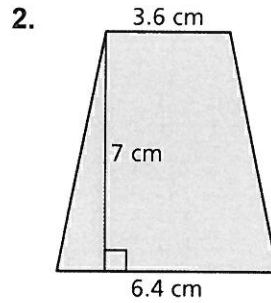
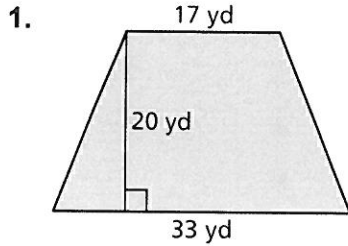
7. The triangle and the trapezoid have the same area. What is the length ℓ of the triangle?



4.3

Practice B Day Two

Find the area of the trapezoid.



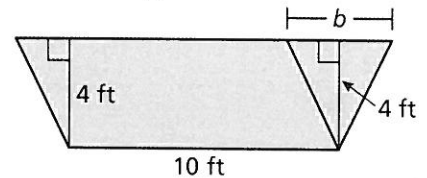
Find the area of a trapezoid with height h and bases b_1 and b_2 .

3. $h = 14$ cm
 $b_1 = 5$ cm
 $b_2 = 11$ cm

4. $h = 6$ ft
 $b_1 = 6.5$ ft
 $b_2 = 2.5$ ft

5. $h = 22$ m
 $b_1 = 9.3$ m
 $b_2 = 10.7$ m

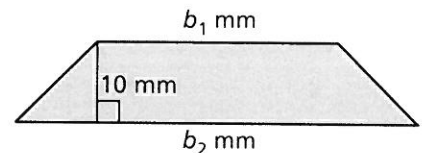
6. The trapezoid consists of a triangle and a parallelogram. The area of the trapezoid is 48 square feet. Find the length of the base of the triangle.



7. The area of the trapezoid is 40 square millimeters.

a. Find two possible values for each base length.

b. Is it possible for b_2 to equal 9 millimeters?
 Explain.

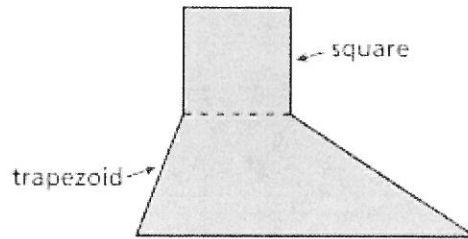
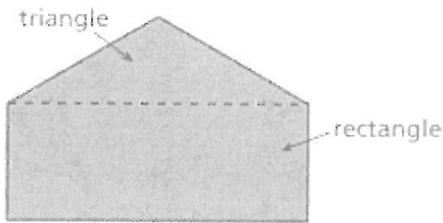


Section 4-3Ext: Area of Composite Figures- ~~Teacher~~ Notes

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

Vocabulary:

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

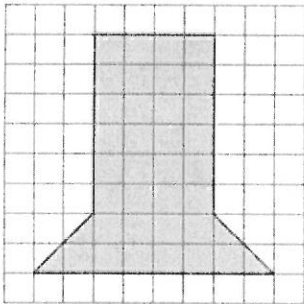


Steps for finding the area of a composite figure:

- 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:

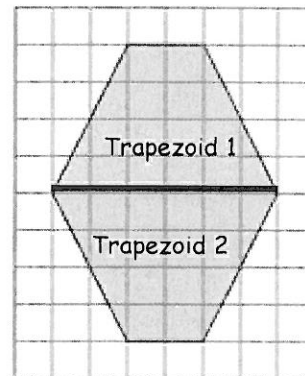
1.)



2.)

Area of trapezoid #1

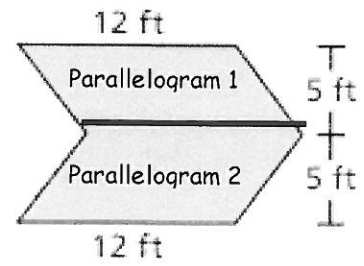
$$A_{\text{trap1}} = \frac{1}{2} (b_1 + b_2) \times h$$



3.)

Area of parallelogram #1

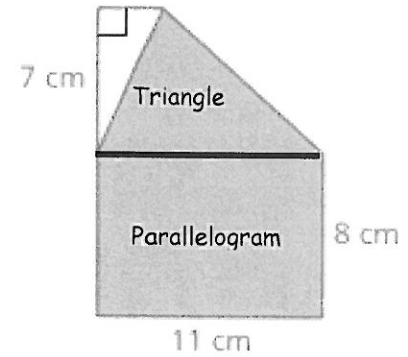
$$A_{\text{parallelogram1}} = b \times h$$



4.)

Area of parallelogram

Area of triangle

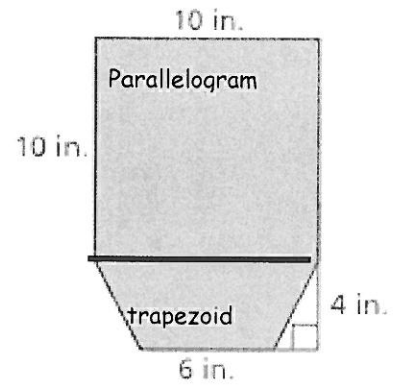


$$\text{Area of figure} = \text{area of parallelogram} + \text{area of triangle}$$
$$=$$

5.)

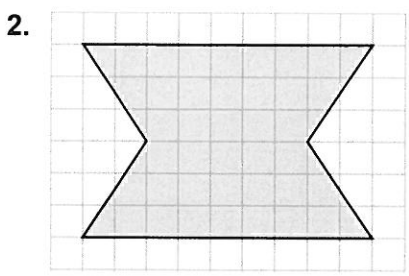
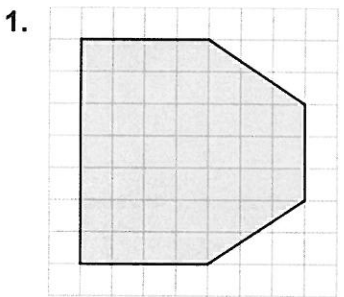
Area of parallelogram

Area of trapezoid



Extension
4.3 Homework Day 1

Find the area of the shaded figure. Show your work.



Find the area of the figure by finding the area of the different shapes that make up the figure and adding those areas together.

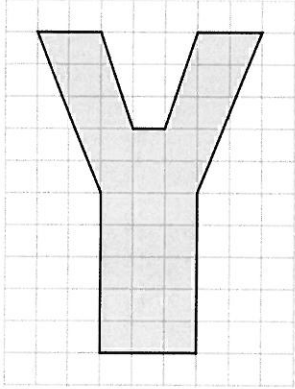
<p>3. </p> <p>Area of trapezoid:</p> <p>Area of rectangle:</p> <p>Total area of figure:</p>	<p>4. (hint: this is made up of four triangles)</p>
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Extension
4.3

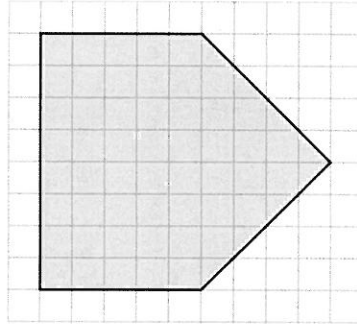
Homework Day 2

Find the area of the shaded figure.

1.

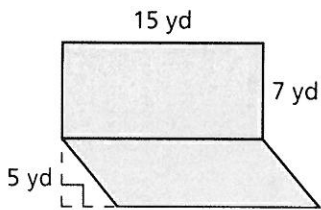


2.

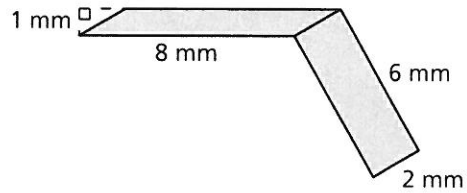


Find the area of the figure.

3.



4.



Section 4-4 Polygons on the Coordinate Plane-

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

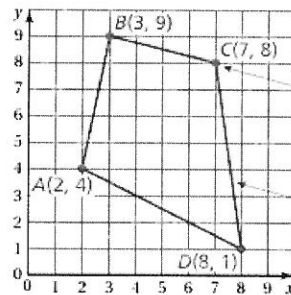
Vocabulary:

- 1.) Area - the amount of surface a shape _____
- 2.) Polygon - a shape with _____ sides
- 3.) Perimeter - the distance around the _____ of a two-dimensional shape; the _____ of the sides of a polygon;
- 4.) Vertex - the _____ 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: $A(2,4)$; $B(3,9)$; $C(7,8)$; $D(8,1)$



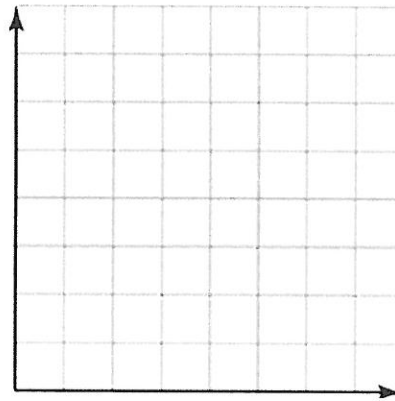
Plot and label the vertices.

Connect the points to form the quadrilateral.

Examples:

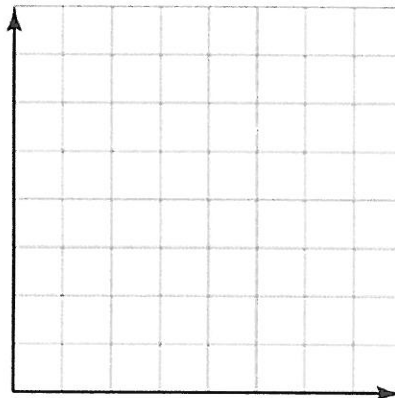
- 1) Draw the polygon with the vertices in a coordinate plane:

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



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

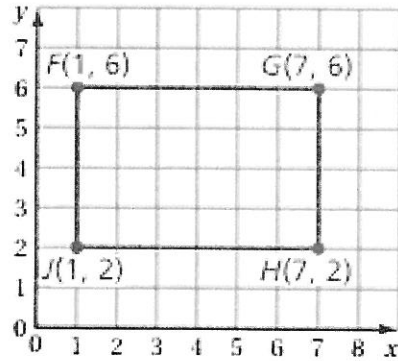
Vertices: $W(_,_)$; $X(_,_)$;
 $Y(_,_)$; $Z(_,_)$



Section 4-4 Polygons on the Coordinate Plane- (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



Length of base = $7 - 1 = \underline{\quad}$ units

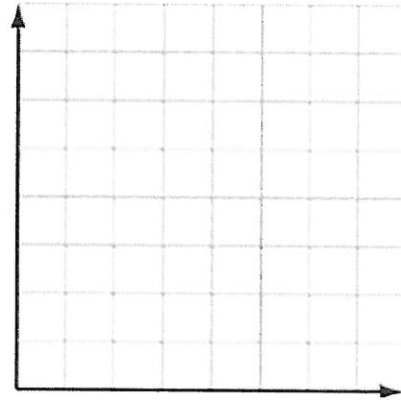
Length of height = $6 - 2 = \underline{\quad}$ units

Perimeter = $\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$ units

Area = $bh = \underline{\quad} \times \underline{\quad} = \text{units}^2$

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 are of the shape.



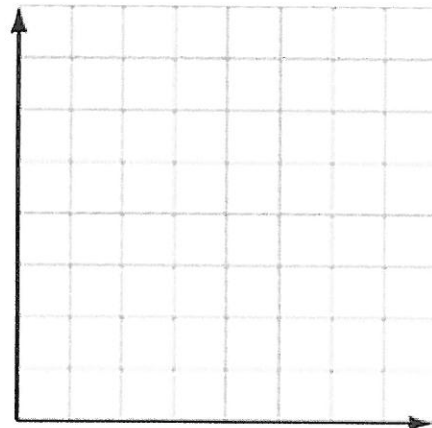
4. In a grid of the exhibits at a zoo, the vertices of the giraffe exhibit are E(0,80), F(60,80), G(70,30), and H(0,30). The coordinates are measured in feet. What is the area of the giraffe exhibit?

$b_1 =$

$b_2 =$

$h =$

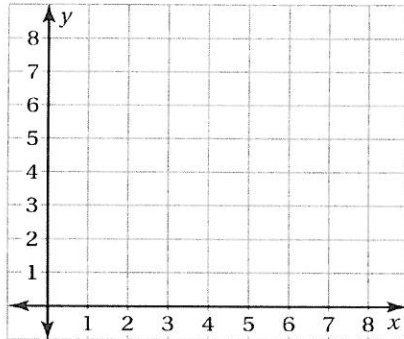
$A =$



4.4 Practice A Day One

Find and label each pair of points in a coordinate plane. Find the length of the line segment connecting the points.

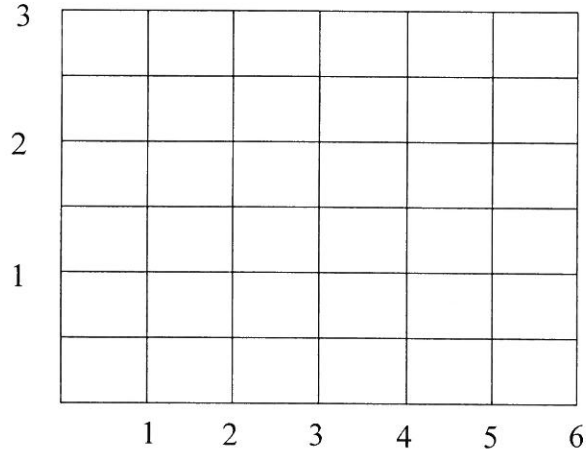
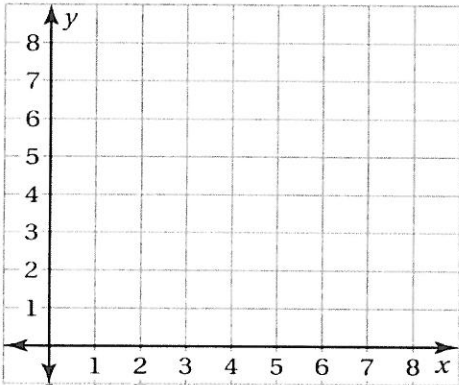
1. $F(1, 0), G(6, 0)$
2. $J(3, 1), K(3, 3)$
3. $W(5, 2), X(7, 2)$



Draw the polygon with the given vertices in a coordinate plane.

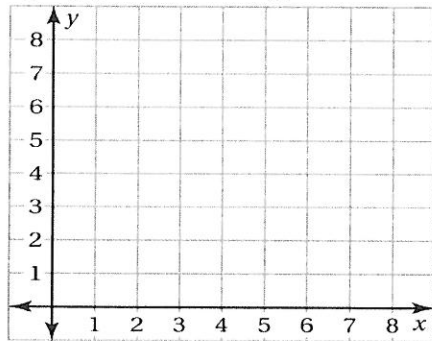
4. $A(2, 5), B(0, 0), C(3, 2)$

5. $D(3, 1), E\left(2, \frac{1}{2}\right), F(6, 2)$



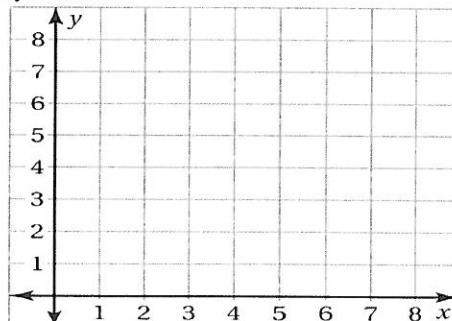
Find the perimeter and area of the polygon with the given vertices.

6. $P(4, 5), Q(4, 9), R(8, 9), S(8, 5)$

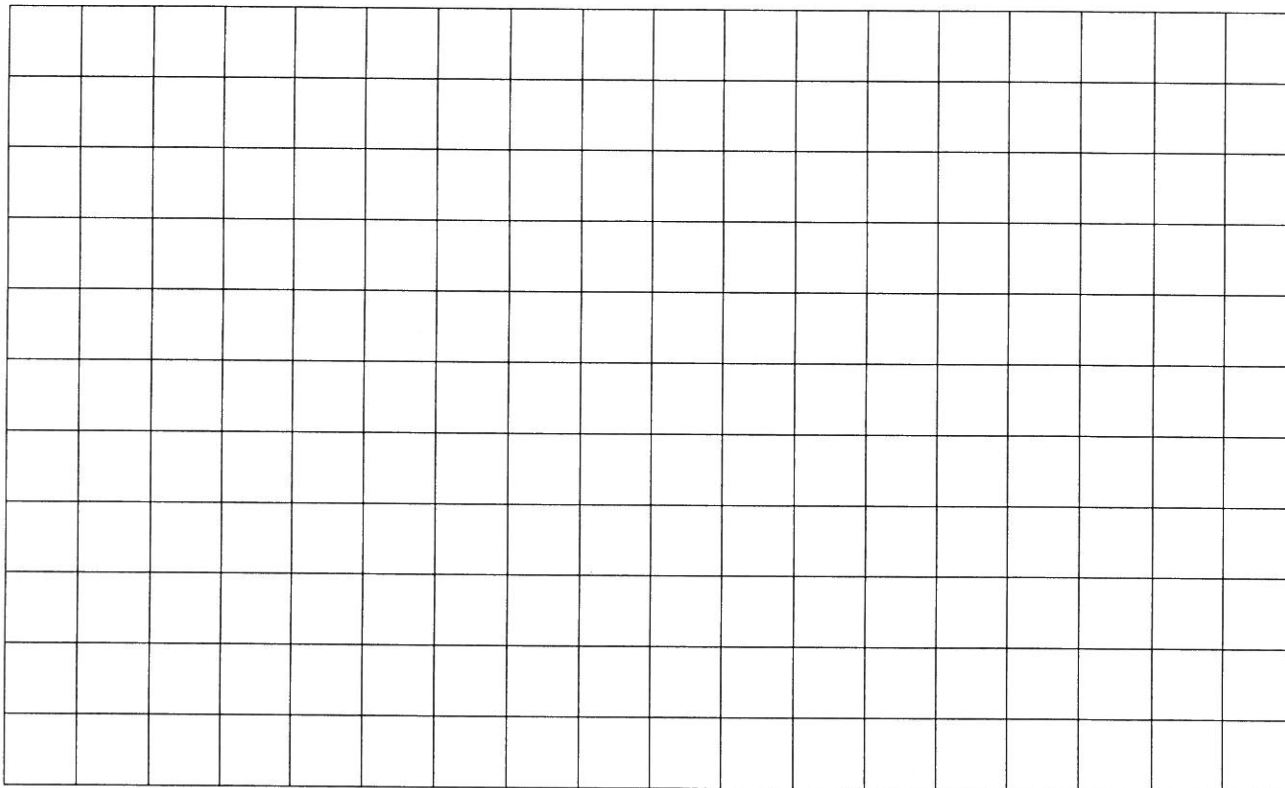


7. You design a courtyard using a coordinate plane. You plot the vertices of the courtyard at $F(1, 0), G(5, 8)$, and $H(1, 8)$. The coordinates are measured in yards.

- a. What is the shape of the courtyard?
- b. What is the area of the courtyard?

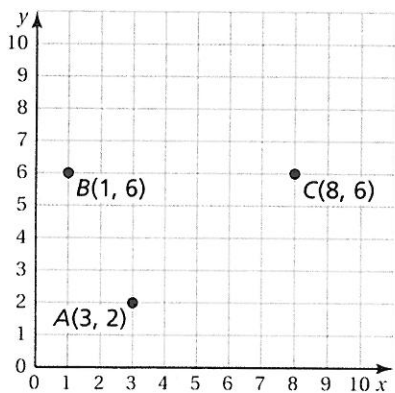


Draw a polygon with the given conditions in a coordinate plane.



- 8. a rectangle with a perimeter of 20 units
- 9. a square with a perimeter of 16 units
- 10. a square with an area of 25 square units
- 11. a triangle with an area of 6 square units

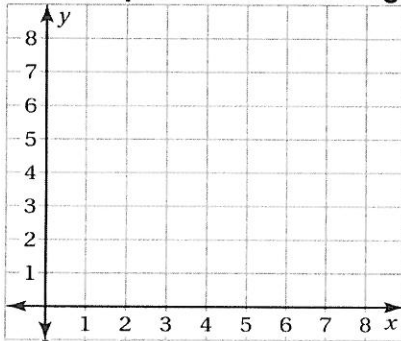
12. The coordinate plane shows three vertices of a parallelogram. Find two possible points that could represent the fourth vertex.



4.4 Practice B Day Two

Plot and label each pair of points in a coordinate plane. Find the length of the line segment connecting the points.

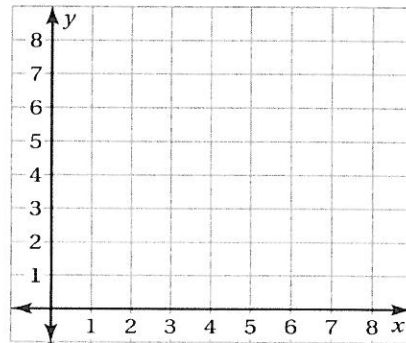
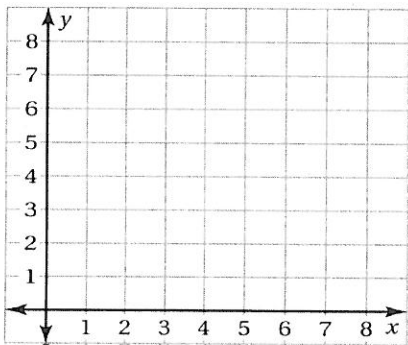
- $D(5, 4), E(5, 10)$
- $L(2, 3), M(8, 3)$
- $U(2, 5), V(9, 5)$



Draw the polygon with the given vertices in a coordinate plane.

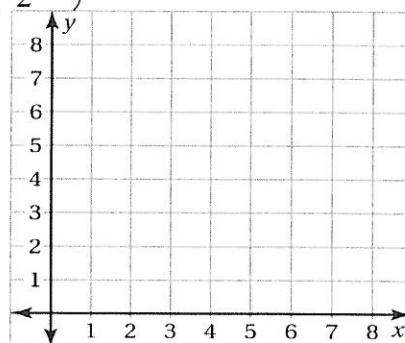
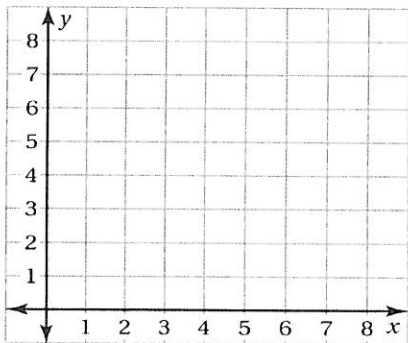
4. $A\left(\frac{1}{2}, 3\right), B(2, 5), C(4, 4)$

5. $D(2, 4), E\left(2, 5\frac{1}{2}\right), F\left(7, 5\frac{1}{2}\right), G(7, 4)$



6. $J(5, 3), K(8, 3), L(8, 1), M(5, 1)$

7. $M\left(1\frac{1}{2}, 5\right), N(4, 7), P(7, 3), Q(7, 1), R(4, 0)$

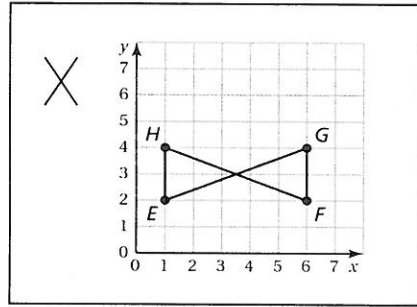


Find the perimeter and area of the polygon with the given vertices without a coordinate grid.

8. $C(4, 1), D(4, 6), E(9, 6), F(9, 1)$

9. $S(8, 4), T(4, 4), U(4, 9), V(8, 9)$

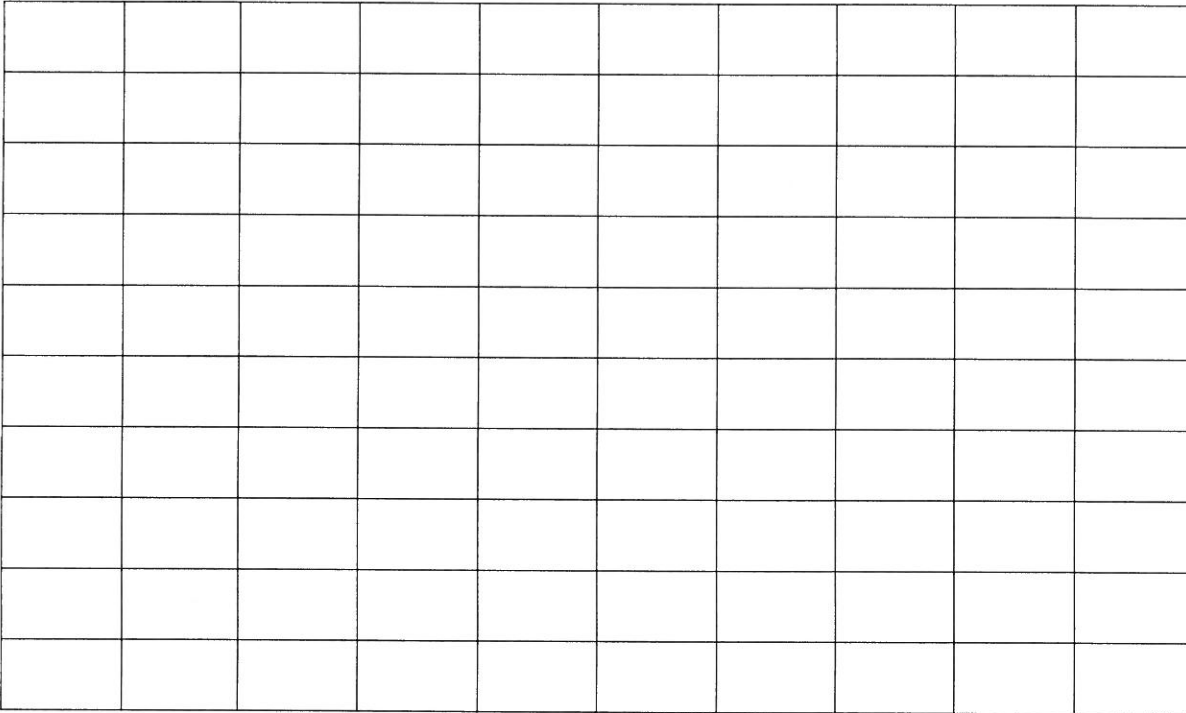
10. Describe and correct the error in drawing a rectangle with vertices $E(1, 2)$, $F(6, 2)$, $G(6, 4)$, $H(1, 4)$.



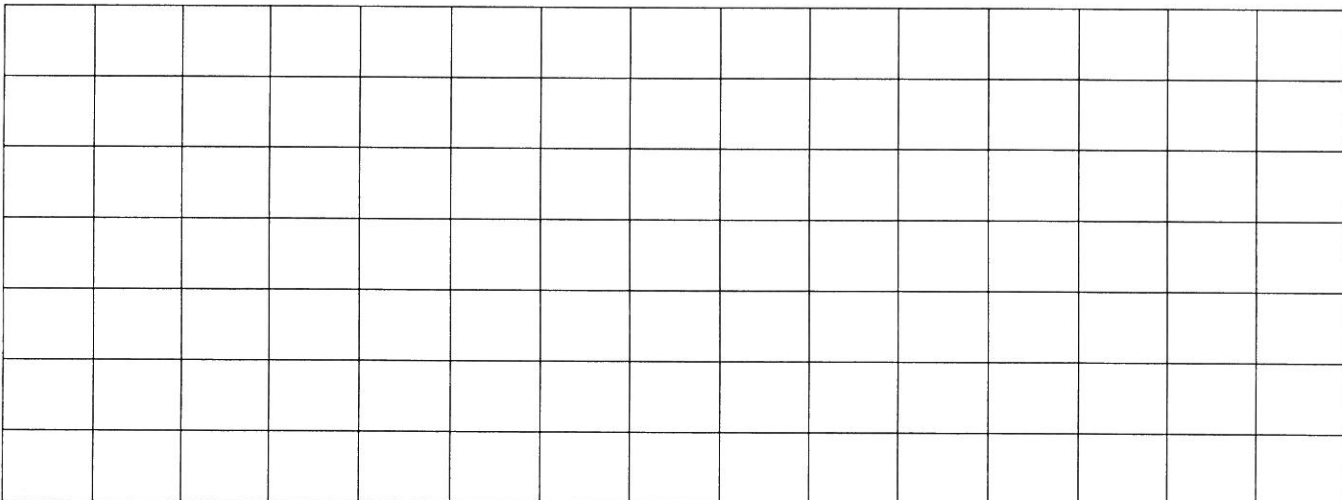
Draw a polygon with the given conditions in a coordinate plane.

11. a rectangle with a perimeter of 24 units

12. a triangle with an area of 21 square units



13. You use a coordinate plane to plot the two bus routes that you can take from your house to your school. You plot your house at $A(5, 5)$ and the school at $C(24, 20)$. The first route includes one bus stop at $B(5, 20)$. The second route includes 3 bus stops at $D(24, 15)$, $E(20, 15)$, and $F(20, 5)$. Which route has the shorter distance? Explain.



Answers

Chapter 4

4.1 Practice A Day One

1. 40 m^2 2. 150 ft^2 3. 99 in.^2 4. 70 m^2

5. The side was used instead of the width.

$$A = 4(4) = 16 \text{ in.}^2$$

6. 2 units^2

4.1 Practice B Day Two

1. 540 ft^2 2. 7200 m^2
 3. 282 yd^2 4. 6000 mm^2
 5. 672 ft^2 6. 102 mm^2
 7. 124 cm^2

4.2 Practice A Day One

1. 18 ft^2 2. 35 cm^2 3. 70 m^2 4. 60 in.^2

5. The area of a triangle is one-half the product of its base and its height, not the product of its base and its height.

$$A = \frac{1}{2}(20)(9) = 90 \text{ ft}^2$$

6. Area of first triangle: 36 mm^2
 Area of second triangle: 36 mm^2
 The areas are the same.

4.2 Practice B Day Two

1. 105 m^2 2. 1500 in.^2 3. 225 ft^2 4. 98 cm^2
 5. 48 in.^2 6. 72 m^2 7. 209 in.^2
 8. $182,812.5 \text{ mm}^2$ 9. 1 acre

4.3 Practice A Day One

1. 34 units^2 2. 33 units^2
 3. 45 in.^2 4. 64 m^2
 5. The bases should be added, not multiplied, in the formula.

$$A = \frac{1}{2}(3)(2 + 6) = 12 \text{ ft}^2$$

6. 10 units^2

7. 22 cm

4.3 Practice B Day Two

1. 500 yd^2 2. 35 cm^2 3. 112 cm^2
 4. 27 ft^2 5. 220 m^2 6. 4 ft

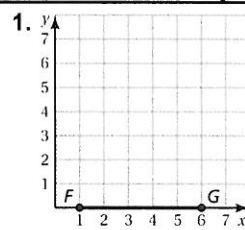
7. a. Sample answers:

$$b_1 = 2 \text{ mm}; b_2 = 6 \text{ mm}$$

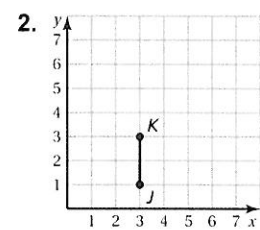
$$b_1 = 3 \text{ mm}; b_2 = 5 \text{ mm}$$

b. no; $b_1 + b_2 = 8$, so b_2 cannot be larger than 8 millimeters.

4.4 Practice A Day One

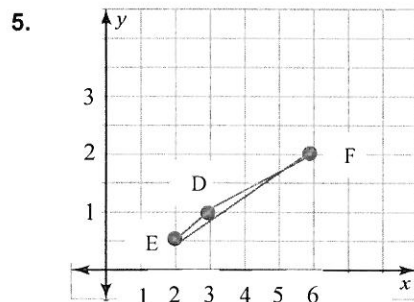
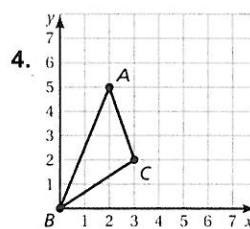
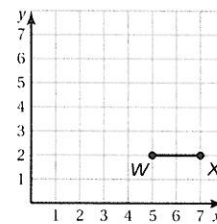


5 units



2 units

3. 2 units

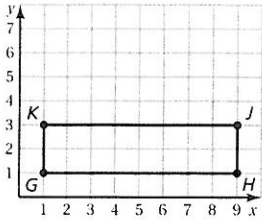


Answers

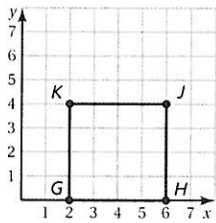
6. 16 units; 16 units²

7. a. triangle b. 16 yd²

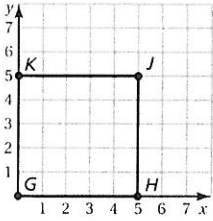
8. *Sample answer:*



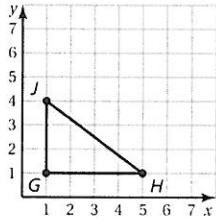
9. *Sample answer:*



10. *Sample answer:*

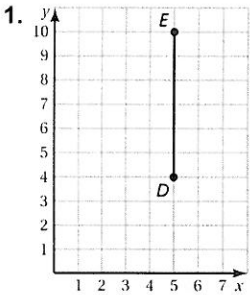


11. *Sample answer:*

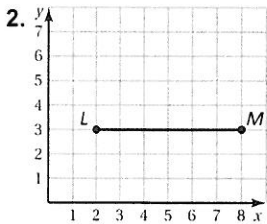


12. $D(10, 2)$; $E(6, 10)$

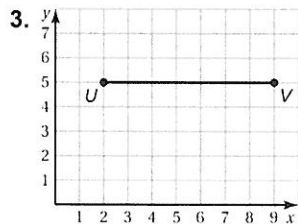
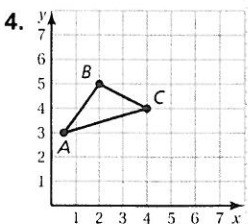
4.4 Practice B Day Two



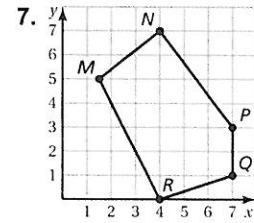
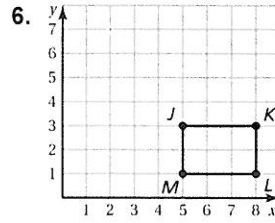
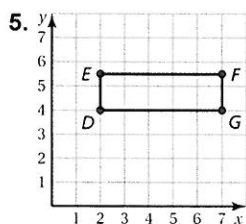
6 units



6 units



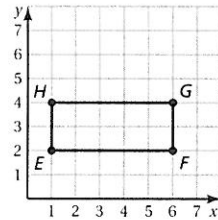
7 units



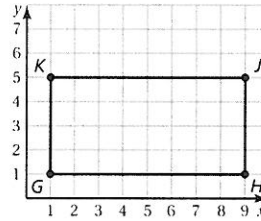
8. 20 units; 25 units²

9. 18 units; 20 units²

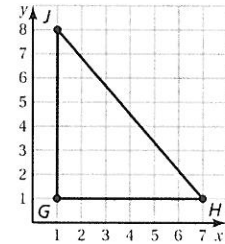
10. Vertices E and F should be connected, and vertices G and H should be connected.



11. *Sample answer:*



12. *Sample answer:*



13. Both routes are the same distance, 34 units.