Name: ______________________ Date: ______________

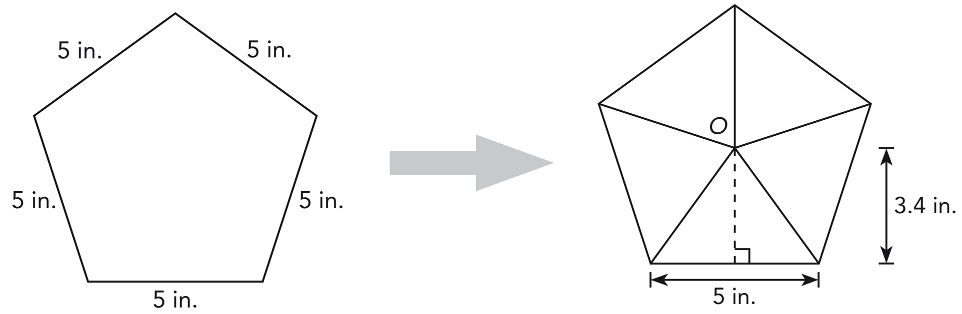
Lesson 10.3 Area of Other Polygons

Solve. Show your work.

Example

Audrey drew a regular pentagon with side lengths of 5 inches. She divided the pentagon into 5 identical triangles, and measured the height of one of the triangles to be 3.4 inches. Find the area of the pentagon.

A **regular** pentagon is a pentagon with equal side lengths.



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

$= \frac{1}{2} \cdot \underline{\ 5\ } \cdot \underline{\ 3.4\ }$

$= \underline{\ 8.5\ }$ in.^{2}

Area of pentagon $= \underline{\ 5\ } \cdot$ area of triangle

$= \underline{\ 5\ } \cdot \underline{\ 8.5\ }$

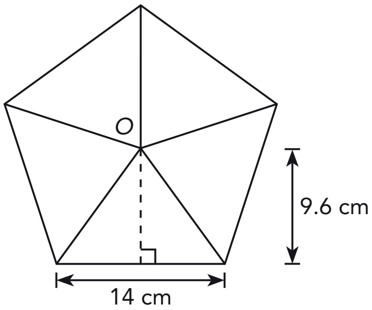
$= \underline{\ 42.5\ }$ in.^{2}

A **pentagon** has five sides. It can be divided into five congruent isosceles triangles.

The area of the pentagon is $\underline{\ 42.5\ }$ square inches.

Name: ______________________ Date: ______________

1. Holly cut out a piece of cardboard in the shape of a regular pentagon to make a birthday card. She divided the cardboard into 5 identical triangles, and measured the height of one of the triangles to be 9.6 centimeters. Find the area of the pentagon.



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

$= \frac{1}{2} \cdot$ ________ $\cdot$ ________

$=$ ________ cm^2

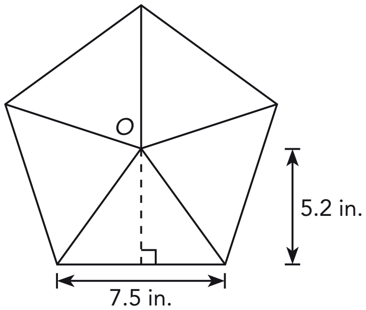
Area of pentagon $=$ ________ $\cdot$ area of triangle

$=$ ________ $\cdot$ ________

$=$ ________ cm^2

The area of the pentagon is ________ square centimeters.

2. Jeremy makes a plate in the shape of a regular pentagon. He divides the plate into 5 identical triangles, and measures the height of one of the triangles to be 5.2 inches. Find the area of the pentagon.

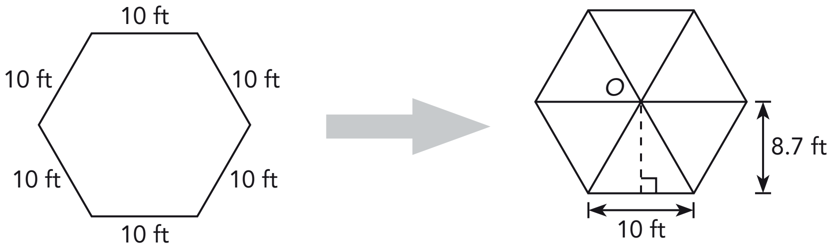


Name: ______________________ Date: ______________

Solve. Show your work.

Example

There is a hexagonal playground in a park near Laura's house. She measured the sides of the playground and found that they were all 10 feet. She then divided the hexagon using a piece of chalk into 6 identical triangles. She measured the height of one triangle and found that it was 8.7 feet. Find the area of the hexagonal playground.



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

$= \frac{1}{2} \cdot \underline{\quad 10 \quad} \cdot \underline{\quad 8.7 \quad}$

$= \underline{\quad 43.5 \quad}$ ft^2

Area of hexagon $= \underline{\quad 6 \quad} \cdot$ area of triangle

$= \underline{\quad 6 \quad} \cdot \underline{\quad 43.5 \quad}$

$= \underline{\quad 261 \quad}$ ft^2

The area of the playground is __261__ square feet.

A regular **hexagon** has six equal sides. It can be divided into six congruent equilateral triangles.

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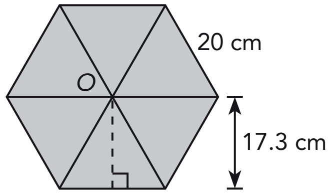
3. Michael has a hexagonal tablemat. He measured the sides and found that they were all 20 centimeters. He then divided the tablemat into 6 identical triangles. He measured the height of one triangle and found that it was 17.3 centimeters. Find the area of the tablemat.



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

$= \frac{1}{2} \cdot$ ________ $\cdot$ ________

$=$ ________ cm^2

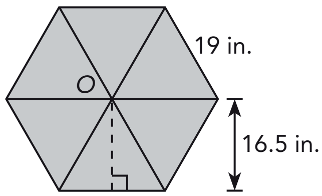
Area of hexagon $=$ ________ $\cdot$ area of triangle

$=$ ________ $\cdot$ ________

$=$ ________ cm^2

The area of the tablemat is ________ square centimeters.

4. The top of a footstool is in the shape of a hexagon. Wendy measured the sides of the hexagon and found that they were all 19 inches. The threads on the top of the footstool divide it into 6 identical triangles. She measured the height of one triangle and found that it was 16.5 inches. Find the area of the hexagon.



8. Area of trapezoid $WXYZ = \frac{1}{2}h(b_1 + b_2)$

$$\underline{540} = \frac{1}{2} \cdot h \cdot (\underline{22} + \underline{38})$$
$$\underline{540} = \frac{1}{2} \cdot h \cdot \underline{60}$$
$$\underline{540} = \frac{1}{2} \cdot \underline{60} \cdot h$$
$$\underline{540} = \underline{30} \cdot h$$
$$\underline{540} \div \underline{30} = \underline{30} \cdot h \div \underline{30}$$
$$\underline{18} = h$$

The height of trapezoid *WXYZ* is $\underline{18}$ inches.

9. 34 meters

10. 23 feet

11. a) Area of trapezoid $CDEF = \frac{1}{2}h(b_1 + b_2)$

$$\underline{832} = \frac{1}{2} \cdot h \cdot (\underline{28.6} + \underline{13})$$
$$\underline{832} = \frac{1}{2} \cdot h \cdot \underline{41.6}$$
$$\underline{832} = \frac{1}{2} \cdot \underline{41.6} \cdot h$$
$$\underline{832} = \underline{20.8} \cdot h$$
$$\underline{832} \div \underline{20.8} = \underline{20.8} \cdot h \div \underline{20.8}$$
$$\underline{40} = h$$

The height of trapezoid *CDEF* is $\underline{40}$ feet.

b) Area of triangle $FDE = \frac{1}{2}bh$

$$= \frac{1}{2} \cdot \underline{13} \cdot \underline{40}$$
$$= \underline{260} \text{ ft}^2$$

The area of triangle *FDE* is $\underline{260}$ square feet.

Lesson 10.3

1. Area of triangle $= \frac{1}{2}bh$

$$= \frac{1}{2} \cdot \underline{14} \cdot \underline{9.6}$$
$$= \underline{67.2} \text{ cm}^2$$

Area of pentagon

$= \underline{5} \cdot$ area of triangle

$= \underline{5} \times \underline{67.2}$

$= \underline{336}$ cm^2

The area of the pentagon is $\underline{336}$ square centimeters.

2. 97.5 square inches

3. Area of triangle $= \frac{1}{2}bh$

$$= \frac{1}{2} \cdot \underline{20} \cdot \underline{17.3}$$
$$= \underline{173} \text{ cm}^2$$

Area of hexagon

$= \underline{6} \cdot$ area of triangle

$= \underline{6} \times \underline{173}$

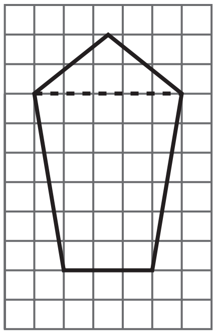
$= \underline{1{,}038}$ cm^2

The area of the tablemat is $\underline{1{,}038}$ square centimeters.

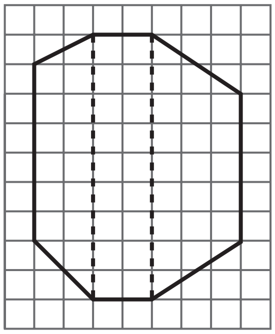
4. 940.5 square inches

Lesson 10.4

1.



2.



3. a) Area of square $= \ell^2$

$$\underline{81} = \ell^2$$
$$\underline{\sqrt{81}} = \ell$$
$$\underline{9} = \ell$$

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

$$= \frac{1}{2} \cdot \underline{15} \cdot \underline{9}$$
$$= \underline{67.5} \text{ ft}^2$$

The area of the triangle *NPQ* is $\underline{67.5}$ square feet.

b) Area of trapezoid *MPQR*

= area of square *MNQR* + area of triangle *NPQ*

$= \underline{81} + \underline{67.5}$

$= \underline{148.5}$ ft^2

The area of trapezoid *MPQR* is $\underline{148.5}$ square feet.

4. a) 7 inches

b) 49 square inches

c) 105 square inches

5. Area of trapezoid $STVY = \frac{1}{2}h(b_1 + b_2)$

$$\underline{242} = \frac{1}{2} \cdot h \cdot (\underline{18} + \underline{18} + \underline{8})$$
$$\underline{242} = \frac{1}{2} \cdot h \cdot \underline{44}$$
$$\underline{242} = \frac{1}{2} \cdot \underline{44} \cdot h$$
$$\underline{242} = \underline{22} \cdot h$$
$$\underline{242} \div \underline{22} = \underline{22} \cdot h \div \underline{22}$$
$$\underline{11} = h$$