

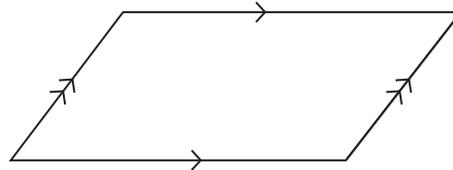
Name: _____

Date: _____

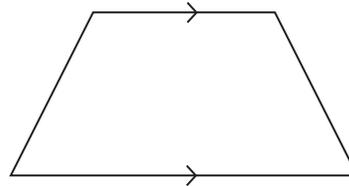
Lesson 10.4 Area of Composite Figures

Draw straight lines to divide each figure. Describe two ways to find the area of each figure.

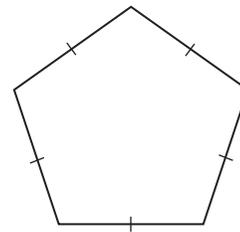
1. Divide the figure into two triangles.



2. Divide the figure into two triangles.

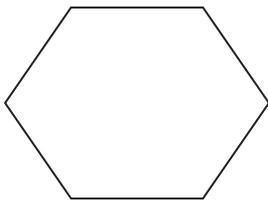


3. Divide the figure into an isosceles triangle, two right-angled triangles, and a trapezoid.

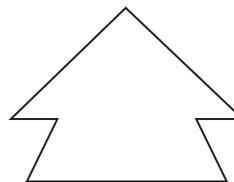


Draw straight lines to divide. Describe a way to find the area of each figure.

4.



5.

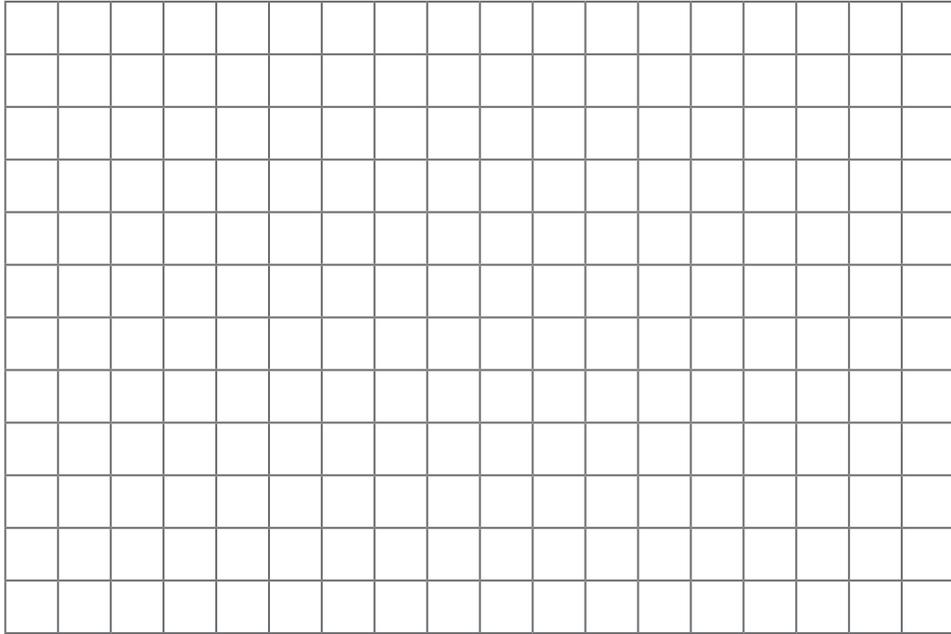


Name: _____

Date: _____

Solve.

6. a) Plot points $A(-3, 6)$, $B(-3, -3)$, $C(2, -1)$, $D(6, -1)$, and $E(2, 4)$ on a coordinate plane.

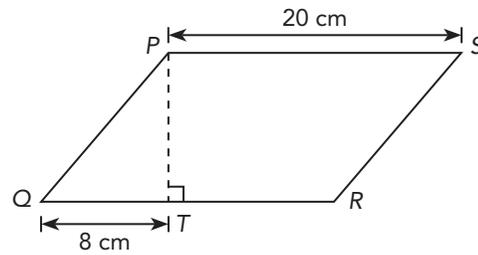


- b) Find the area of figure $ABCDE$.
- c) Point F lies on \overline{EC} . The area of triangle EDF is $\frac{3}{5}$ the area of triangle EDC .
Give the coordinates of point F . Plot point F on the coordinate plane. Draw a segment joining points D and F and shade triangle EDF .

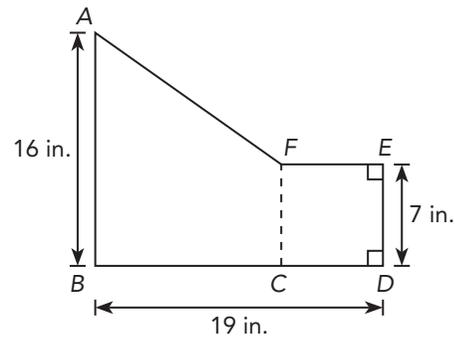
Name: _____

Date: _____

7. Parallelogram $PQRS$ is made up of a trapezoid and a triangle. The area of triangle PQT is 28 square centimeters. Find the height of the triangle. Then find the area of parallelogram $PQRS$.



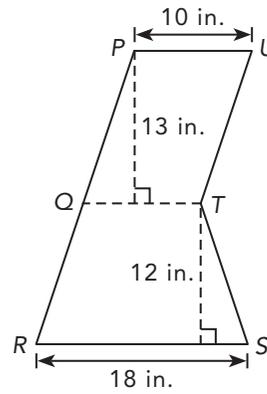
8. The figure is made up of square $CDEF$ and trapezoid $ABCF$. Find the area of the figure.



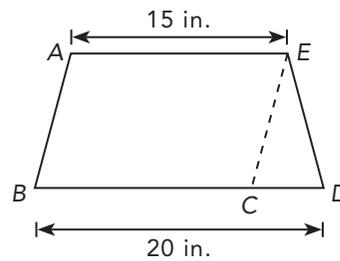
Name: _____

Date: _____

9. The figure is formed by trapezoid $QRST$ and parallelogram $PQTU$. Find the area of the figure.



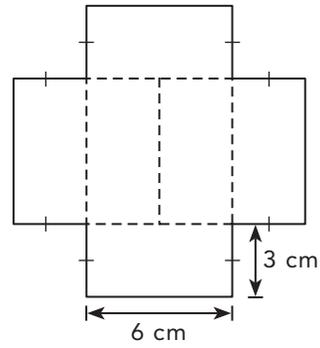
10. Trapezoid $ABDE$ is made up of parallelogram $ABCE$ and triangle CDE . The area of parallelogram $ABCE$ is 135 square inches. Find the area of triangle CDE . Then find the area of trapezoid $ABDE$.



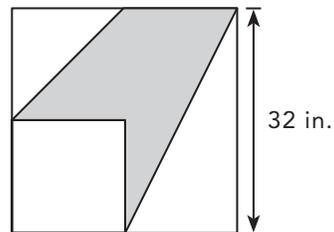
Name: _____

Date: _____

11. The figure below is formed by overlapping four identical square cards in a certain way. Each square card has a length of 6 centimeters. Find the area of the figure.



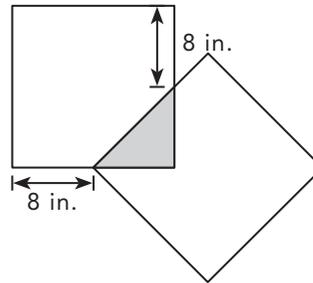
12. $\frac{3}{8}$ of the square is shaded. Find the area of the shaded region.



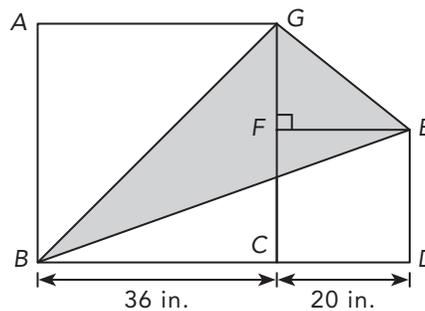
Name: _____

Date: _____

13. The figure is formed by two identical squares with a side length of 16 inches. The ratio of the area of the shaded region to the unshaded region of the figure is 1 : 14. Find the area of the unshaded region.



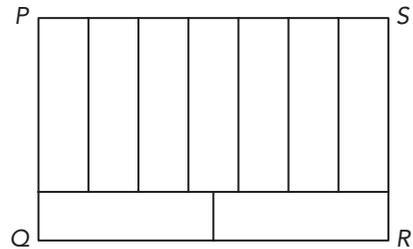
14. The figure is made up of two squares and a right triangle. Find the area of the shaded region.



Name: _____

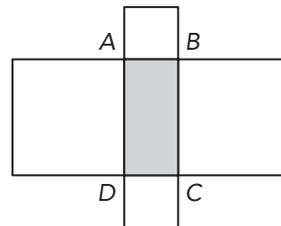
Date: _____

15. Rectangle $PQRS$ is formed by putting 9 identical small rectangles together without overlapping. The perimeter of the figure is 138 inches.
- a) Find the area of each small rectangle.



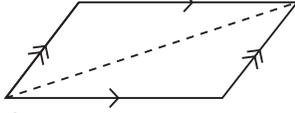
- b) Find the area of rectangle $PQRS$.

16. Paul draws a rectangle $ABCD$ with a perimeter of 30 inches. He then draws a square on each side of the rectangle, as shown. The total area of the four squares is 234 square inches. What is the area of rectangle $ABCD$?

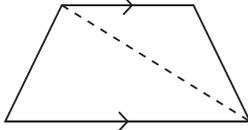


Lesson 10.4

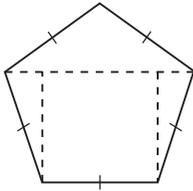
1. bh ; sum of the areas of the two triangles



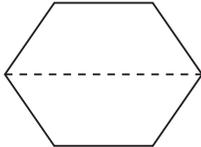
2. $\frac{1}{2}h(b_1 + b_2)$; sum of the areas of the two triangles



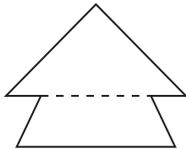
3. Sum of the areas of the 5 identical triangles; sum of the areas of an isosceles triangle, two right triangles, and a rectangle



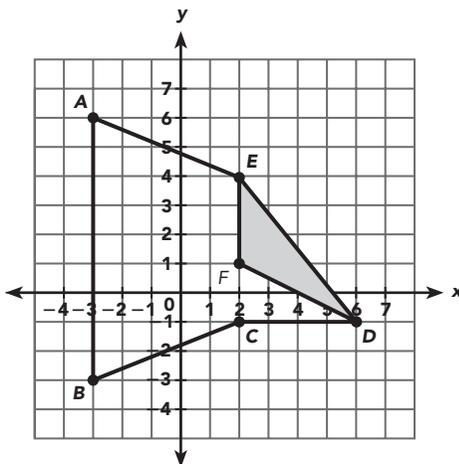
4. Sum of the areas of two trapezoids



5. Sum of the areas of a triangle and a trapezoid



6. a)



- b) The area of figure $ABCDE$ is formed by a trapezoid and a triangle.

$$\begin{aligned} \text{Area of trapezoid } ABCE &= \frac{1}{2} \cdot 5(5 + 9) \\ &= 35 \text{ square units} \end{aligned}$$

Area of the triangle

$$= \frac{1}{2} \cdot 4 \cdot 5$$

$$= 10 \text{ square units}$$

Area of figure $ABCDE$

$$= 35 + 10$$

$$= 45 \text{ square units}$$

- c) There are five units along EC . So, point F is three units from E . The coordinates of point F are $(2, 1)$.

7. Height of the triangle

$$= \frac{28 \cdot 2}{8} = 7 \text{ cm}$$

Area of parallelogram $PQRS$

$$= 20 \cdot 7 = 140 \text{ cm}^2$$

8. Area of square $CDEF$

$$= 7 \cdot 7 = 49 \text{ in.}^2$$

Area of trapezoid $ABCF$

$$= \frac{1}{2} (19 - 7)(16 + 7) = 138 \text{ in.}^2$$

Area of figure $ABCDE$

$$= 49 + 138 = 187 \text{ square inches}$$

9. Area of parallelogram $PQTU$

$$= 10 \cdot 13 = 130 \text{ in.}^2$$

Area of trapezoid $QRST$

$$= \frac{1}{2} \cdot 12(18 + 10) = 168 \text{ in.}^2$$

Area of figure

$$= 130 + 168 = 298 \text{ square inches}$$

10. Height of parallelogram $ABCE$

$$= \frac{135}{15} = 9 \text{ in.}$$

Area of triangle CDE

$$= \frac{1}{2} \cdot 9(20 - 15) = 22.5 \text{ in.}^2$$

Area of trapezoid $ABCDE$

$$= 135 + 22.5 = 157.5 \text{ square inches}$$

11. $6 \cdot 6 \cdot 3 = 108$ square centimeters

12. $32 \cdot 32 = 1,024 \text{ in.}^2$

Area of the shaded region

$$= \frac{3}{8} \text{ of the area of the square}$$

$$= \frac{3}{8} \cdot 32 \cdot 32$$

$$= 384 \text{ square inches}$$

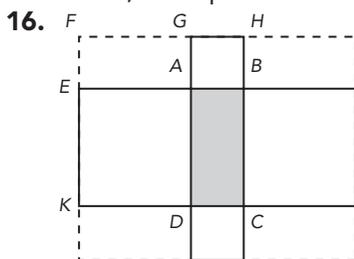
13. Area of the shaded region

$$= \frac{1}{2} \cdot 8 \cdot 8 = 32 \text{ in.}^2$$

Area of the unshaded region

$$= 32 \cdot 14 = 448 \text{ square inches}$$

14. Area of trapezoid $CDEG$
 $= \frac{1}{2} \cdot 20(36 + 20) = 560 \text{ in.}^2$
 Area of triangle BCG
 $= \frac{1}{2} \cdot 36 \cdot 36 = 648 \text{ in.}^2$
 Area of triangle BDE
 $= \frac{1}{2} \cdot 20(36 + 20) = 560 \text{ in.}^2$
 Area of the shaded region
 $= 560 + 648 - 560$
 $= 648 \text{ square inches}$
15. a) $PS = 7$ units, $PQ = 4.5$ units
 Perimeter of $PQRS$
 $= 7 \cdot 2 + 4.5 \cdot 2 = 23$ units
 $23 \text{ units} \rightarrow 138 \text{ in.}$
 $1 \text{ unit} \rightarrow 138 \div 23 = 6 \text{ in.}$
 Length of each small rectangle
 $= 3.5$ units
 $3.5 \cdot 6 = 21 \text{ in.}$
 Area of each small rectangle
 $= 21 \cdot 6$
 $= 126 \text{ square inches}$
- b) $126 \cdot 9 = 1,134 \text{ in.}^2$
 The area of rectangle $PQRS$ is
 $1,134 \text{ square inches.}$

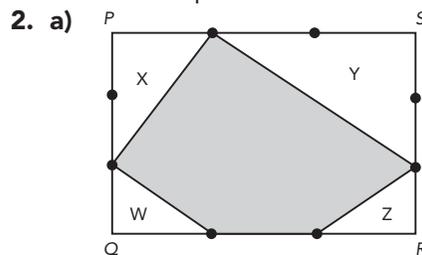


By observation:
 Area of $EFGA = \text{area of } ABCD$
 Length of square $FHCK$
 $= \text{perimeter of } ABCD \div 2$
 $= 30 \div 2 = 15 \text{ in.}$
 Area of square $FHCK$
 $= 15 \cdot 15 = 225 \text{ in.}^2$
 Total area of square $ADKE$ and square $ABHG$
 $= 234 \div 2 = 117 \text{ in.}^2$
 Area of rectangle $ABCD$
 $= (225 - 117) \div 2$
 $= 54 \text{ in.}^2$
 The area of rectangle $ABCD$ is
 $54 \text{ square inches.}$

Brain @ Work

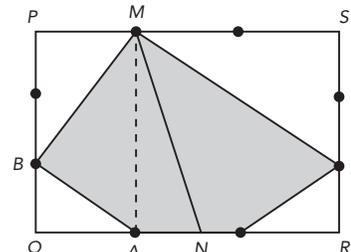
1. a) Each equilateral triangle can be divided into 9 smaller equilateral triangles.
 Area of each smaller triangle
 $= 18 \div 9 = 2 \text{ cm}^2$
 Area of the shaded region is formed by six smaller equilateral triangles
 $= 6 \cdot 2 = 12 \text{ square centimeters}$

- b) Area of composite figure
 $= 18 \cdot 2 - 12$
 $= 24 \text{ square centimeters}$



Area of $PQRS$
 $= 18 \cdot 12 = 216 \text{ in.}^2$
 Area of triangle X
 $= \frac{1}{2} \cdot 6 \cdot 8 = 24 \text{ in.}^2$
 Area of triangle Y
 $= \frac{1}{2} \cdot 12 \cdot 8 = 48 \text{ in.}^2$
 Area of triangle W
 $= \text{area of triangle } Z$
 $= \frac{1}{2} \cdot 6 \cdot 4 = 12 \text{ in.}^2$
 Shaded region
 $= 216 - (24 + 48 + 12 + 12)$
 $= 120 \text{ square inches}$

- b) Equal parts
 $= 120 \div 2 = 60 \text{ in.}^2$



Area of triangle MBA
 $= \frac{1}{2} \cdot 12 \cdot 6 = 36 \text{ in.}^2$
 Area of triangle AMN
 $= 60 - 36 = 24 \text{ in.}^2$
 Length of base \overline{AN}
 $= \frac{24 \cdot 2}{12} = 4 \text{ in.}$
 Length of \overline{QN}
 $= 6 + 4 = 10 \text{ inches}$

Chapter 11

Lesson 11.1

- $2 \cdot 3.14 \cdot 11 = 69.08 \text{ inches}$
- $3.14 \cdot 50 = 157 \text{ centimeters}$
- Length of the semicircular arc
 $\approx \frac{1}{2} \cdot \frac{22}{7} \cdot 42 = 66 \text{ cm}$
 Distance around the semicircle
 $= 66 + 42 = 108 \text{ centimeters}$