

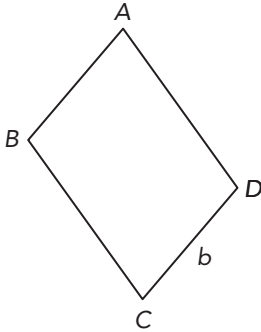
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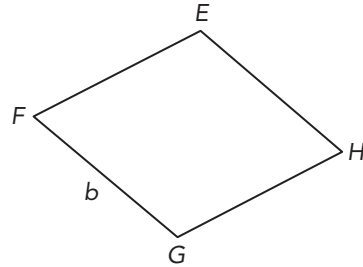
Lesson 10.2 Area of Parallelograms and Trapezoids

For each parallelogram, draw and label the height h for the given base b .

1.

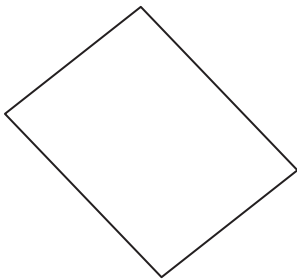


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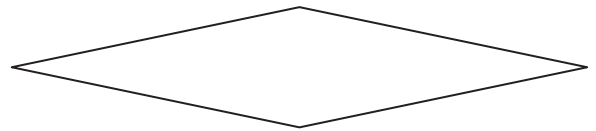


For each parallelogram, label a base and a height. Use b and h .

3.

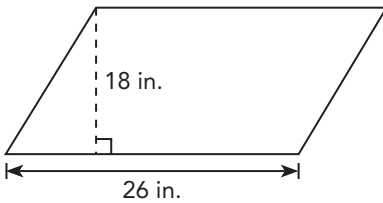


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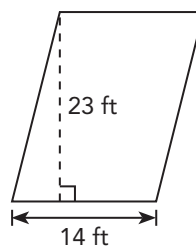


Find the area of each parallelogram.

5.



6.

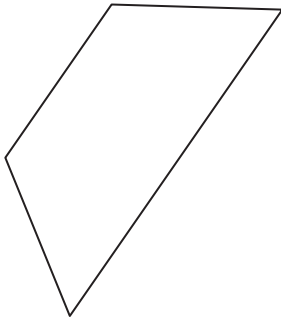


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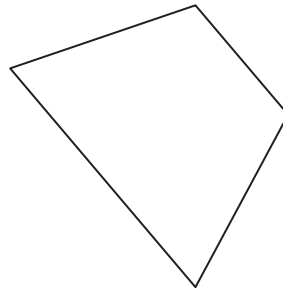
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For each trapezoid, label the height and bases. Use h , b_1 , and b_2 .

7.

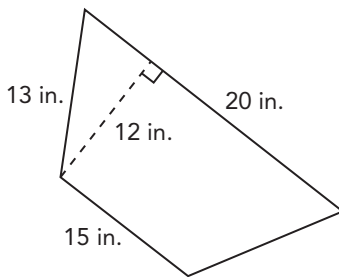


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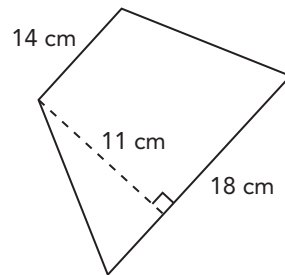


Find the area of each trapezoid.

9.

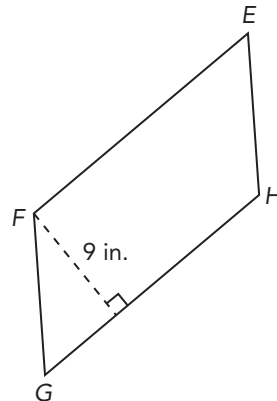


10.



Solve. Show your work.

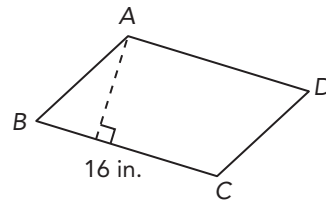
11. The area of parallelogram $EFGH$ is 207 square inches. Its height is 9 inches. Find the length of \overline{GH} .



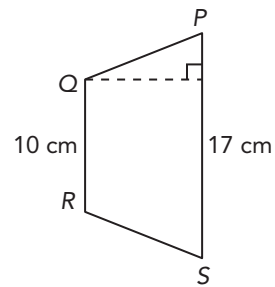
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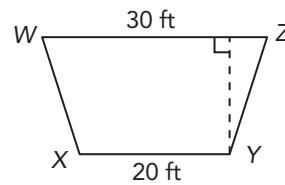
12. The area of parallelogram $ABCD$ is 112 square inches. The length of \overline{BC} is 16 inches. Find the height.



13. The area of trapezoid $PQRS$ is 108 square centimeters. Find the height.



14. The area of trapezoid $WXYZ$ is 375 square feet. Find the height.

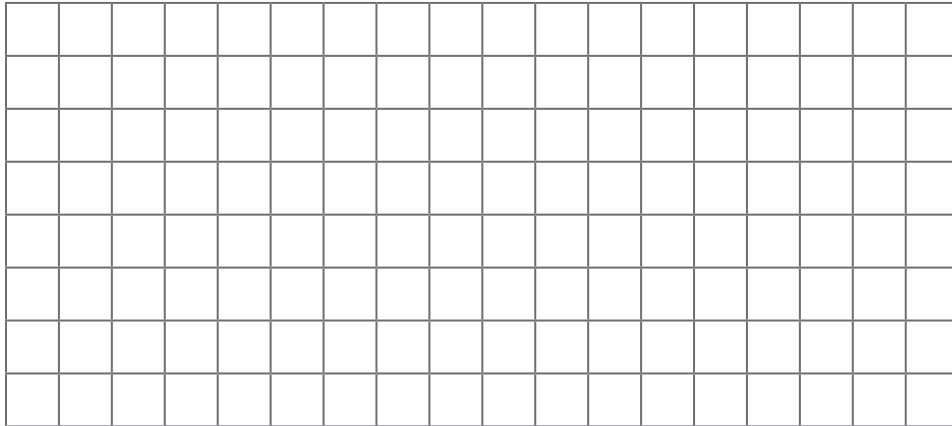


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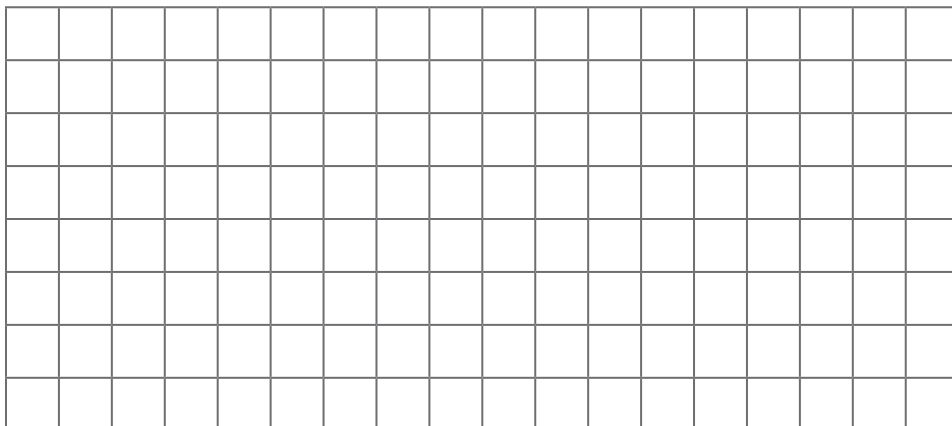
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Solve.

15. Three out of the four coordinates of the vertices of a parallelogram are $A(0, 3)$, $B(-3, -2)$, and $D(5, 3)$. Plot the coordinates on the coordinate plane. Find the coordinates of point C . Then find the area of parallelogram $ABCD$.



16. The coordinates of the vertices of a trapezoid are $P(-4, -1)$, $Q(5, -1)$, $R(3, 4)$, and $S(0, 4)$. Plot the coordinates on the coordinate plane. Find the area of trapezoid $PQRS$.

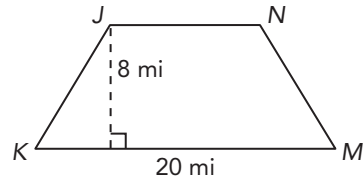


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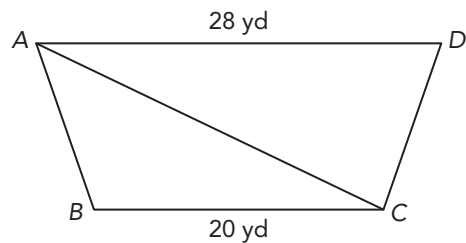
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Solve. Show your work.

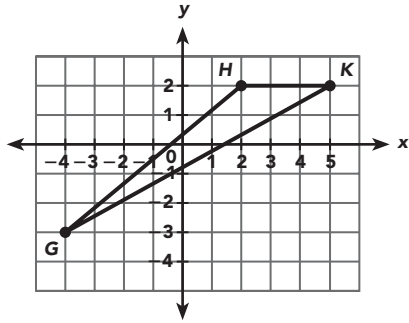
17. The area of trapezoid $JKMN$ is 136 square miles. Its height is 8 miles. Find the length of JN .



18. Trapezoid $ABCD$ is made up of triangles ABC and ADC . The area of trapezoid $ABCD$ is 312 square yards. Find the area of triangle ABC .



23.



$$\text{Area} = \frac{1}{2} \cdot 3 \cdot 5 = 7.5 \text{ square units}$$

24. Base of triangle $HKM = \sqrt{64} = 8$ in.
 Height of triangle $HKM = \sqrt{144} - 8 = 4$ in.
 Area of triangle $HKM = \frac{1}{2} \cdot 8 \cdot 4 = 16$ in.²
 Area of the figure
 $= 144 + 64 + 16$
 $= 224$ square inches

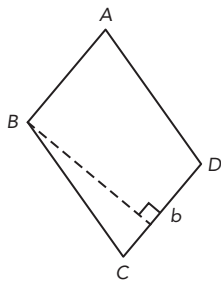
25. Length of 1 side:
 $160 \div 4 = 40$ in.
 By observation, triangles PQM and NPS together make up $\frac{1}{2}$ of the square, and triangle MNR make up $\frac{1}{8}$ of the square.
 $1 - \frac{1}{2} - \frac{1}{8} = \frac{8}{8} - \frac{4}{8} - \frac{1}{8} = \frac{3}{8}$
 So, the area of triangle PMN is $\frac{3}{8}$ the area of $PQRS$.

$$\begin{aligned} \text{Area of triangle } PMN &= \frac{3}{8} \cdot 40 \cdot 40 \\ &= 600 \text{ square inches} \end{aligned}$$

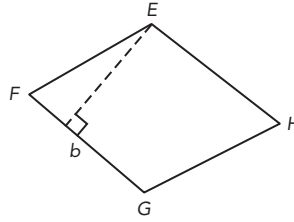
26. Length of the small square
 $= 16 - 12 = 4$ in.
 Area of the larger square
 $= 4 \left(\frac{1}{2} \cdot 16 \cdot 12 \right) + 4 \cdot 4 = 400$ in.²
 Side length of the larger square
 $= \sqrt{400} = 20$ inches

Lesson 10.2

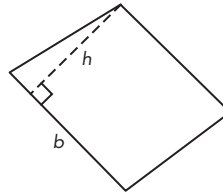
1.



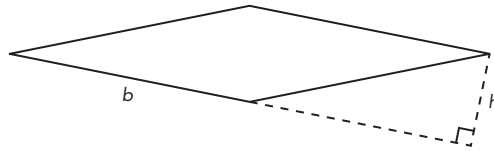
2.



3. Answers vary. Sample:



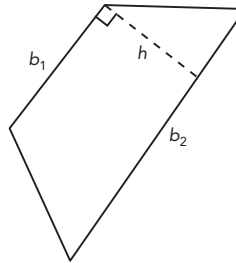
4. Answers vary. Sample:



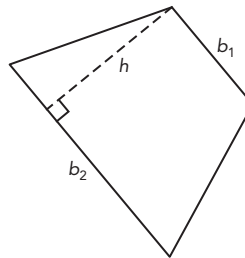
5. $26 \cdot 18 = 468$ square inches

6. $14 \cdot 23 = 322$ square feet

7.



8.



$$\begin{aligned} 9. \quad &\frac{1}{2} \cdot 12(15 + 20) \\ &= 210 \text{ square inches} \end{aligned}$$

$$\begin{aligned} 10. \quad &\frac{1}{2} \cdot 11(14 + 18) \\ &= 176 \text{ square centimeters} \end{aligned}$$

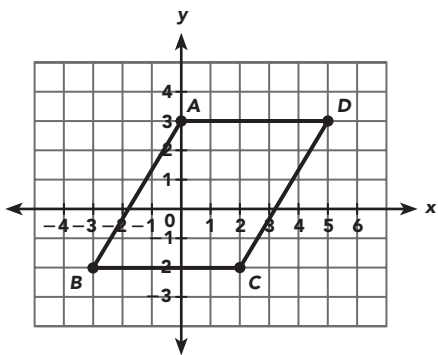
$$11. \quad 207 \div 9 = 23 \text{ inches}$$

$$12. \quad 112 \div 16 = 7 \text{ inches}$$

$$\begin{aligned} 13. \quad \text{Area} &= \frac{1}{2}h(10 + 17) = 108 \text{ cm}^2 \\ h &= 108 \cdot 2 \div 27 \\ &= 8 \text{ centimeters} \end{aligned}$$

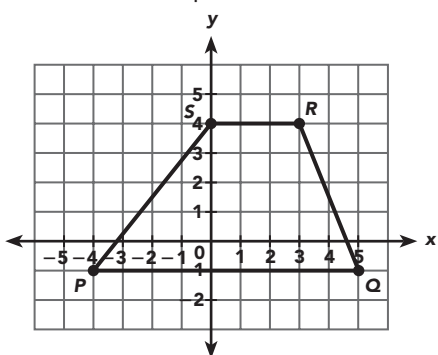
$$\begin{aligned} 14. \quad \text{Area} &= \frac{1}{2}h(30 + 20) = 375 \\ h &= 375 \cdot 2 \div 50 = 15 \text{ feet} \end{aligned}$$

15.



The coordinates of point C are (2, -2).
 Base = 5 units, height = 5 units
 Area of parallelogram ABCD
 $= 5 \cdot 5 = 25$ square units

16.



$RS = 3$ units, $PQ = 9$ units,
 height = 5 units
 Area of trapezoid PQRS
 $= \frac{1}{2} \cdot 5(3 + 9) = 30$ square units

17. $\frac{1}{2} \cdot 8(JN + 20) = 136$

$4(JN + 20) = 136$

$JN = 136 \div 4 - 20 = 14$ miles

18. $\frac{1}{2} \cdot h(20 + 28) = 312$

$h = 312 \cdot 2 \div 48$

$= 13$ yards

Area of triangle ABC

$= \frac{1}{2} \cdot 20 \cdot 13 = 130$ square yards

Lesson 10.3

1. 7 triangles

2. 10 triangles

3. Area of a triangle

$= \frac{1}{2} \cdot 17.5 \cdot 12$

$= 105 \text{ cm}^2$

Area of the pentagon

$= 5 \cdot 105$

$= 525$ square centimeters

4. Area of a triangle

$= \frac{1}{2} \cdot 12 \cdot 10.3$

$= 61.8 \text{ in.}^2$

Area of the hexagon

$= 6 \cdot 61.8$

$= 370.8$ square inches

5. The pentagon is made up of 5 identical triangles.

Area of each triangle

$= 292.5 \div 5 = 58.5 \text{ ft}^2$

1 side of the pentagon

$= \frac{58.5 \cdot 2}{9} = 13$ feet

6. The hexagon is made up of 6 identical triangles.

Area of each triangle

$= 93.6 \div 6 = 15.6 \text{ in.}^2$

Height of each triangle

$= \frac{15.6 \cdot 2}{6} = 5.2$ in.

Height of the hexagon

$= 5.2 \cdot 2 = 10.4$ inches

7. Area of the hexagon

$= 3 \cdot (7 \cdot 6)$

$= 126$ square centimeters

8. Area of a triangle

$= \frac{1}{2} \cdot 8.4 \cdot 13$

$= 54.6 \text{ cm}^2$

Area of the polygon

$= 54.6 \cdot 10$

$= 546$ square centimeters

9. Area of trapezoid ABHG

 $=$ Area of trapezoid CDEF

$= \frac{1}{2}(10 + 24) \cdot 7$

$= 119 \text{ cm}^2$

Area of rectangle BCGF

$= 24 \cdot 10$

$= 240 \text{ cm}^2$

Area of the polygon

$= 119 + 119 + 240$

$= 478$ square centimeters

10. Area of triangle OAB

$= \frac{1}{2} \cdot 18 \cdot 26$

$= 234 \text{ cm}^2$

Area of the pentagon

$= 234 \cdot 5$

$= 1,170 \text{ cm}^2$

Area of triangle AEF

$= \frac{1}{2} \cdot 42.3 \cdot 24.7$

$= 522.405 \text{ cm}^2$

Area of the figure

$= 1,170 + 522.405$

$= 1,692.405$ square centimeters