

CHAPTER

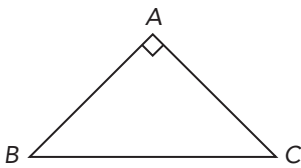


Area of Polygons

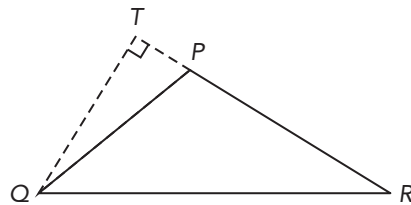
Lesson 10.1 Area of Triangles

Identify a base and a height for each triangle.

1.

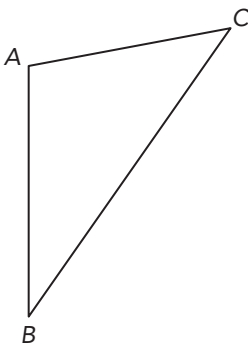


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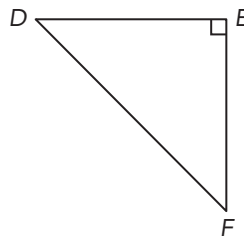


For each triangle, label a base with the letter b and a height with the letter h .

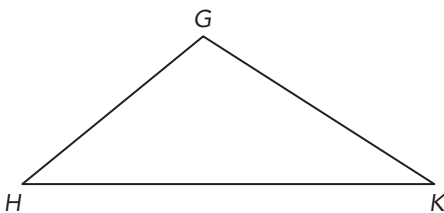
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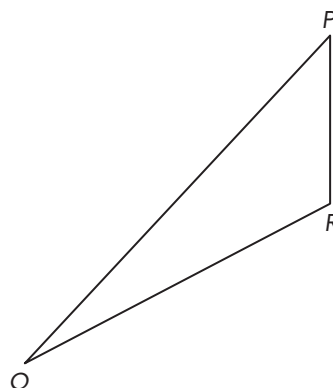
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5.



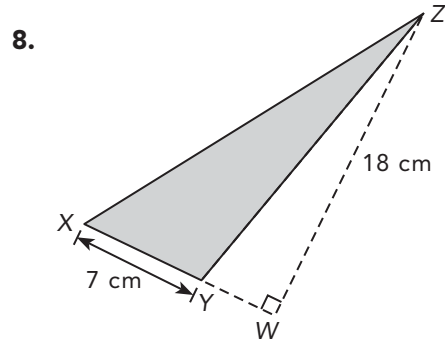
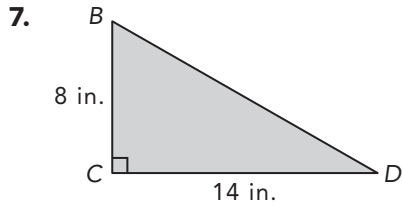
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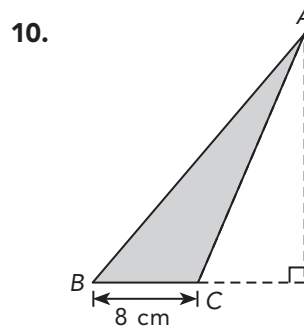
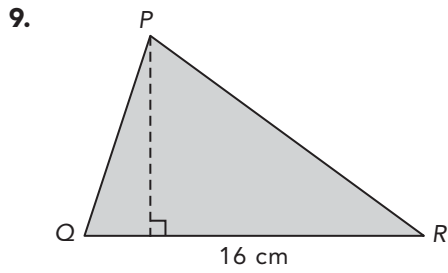
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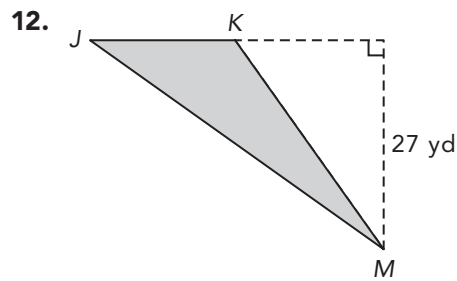
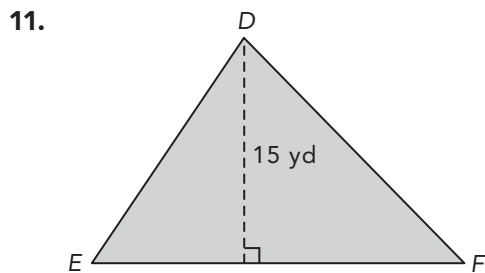
Find the area of each triangle.



The area of each triangle is 96 square centimeters. Find the height.



The area of each triangle is 135 square yards. Find the base.

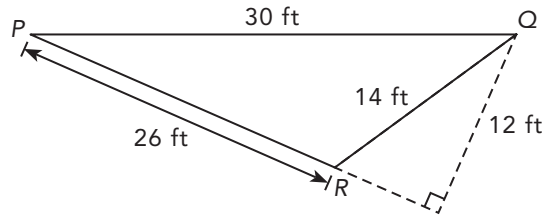


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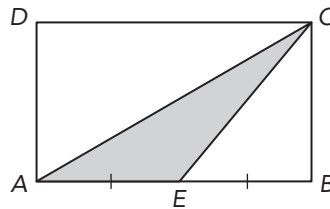
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Solve. Show your work.

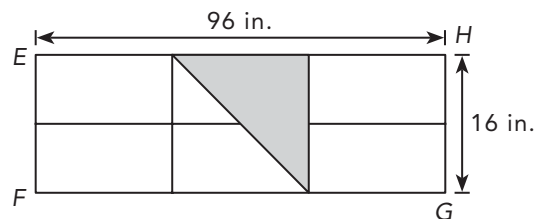
13. Triangle PQR is a section of a ball field. Find the area of triangle PQR .



14. The area of triangle AEC is 28 square inches. Find the area of the unshaded region of rectangle $ABCD$.



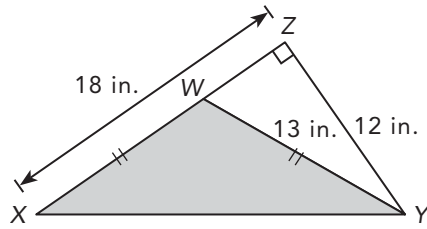
15. Rectangle $EFGH$ is divided into six identical rectangles. Find the area of the shaded region.



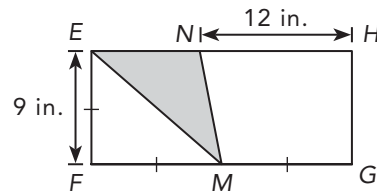
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16. Triangle XYZ is a right triangle. Triangle WXY is an isosceles triangle. Find the area of triangle WXY .

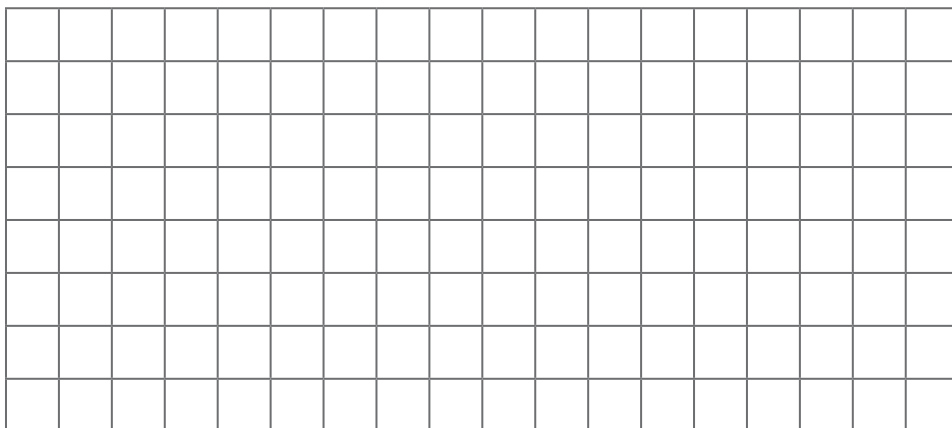


17. Figure $EFGH$ is a rectangle. Point M is the mid-point of \overline{FG} . If $EF = FM$, what is the area of triangle EMN ?



Solve.

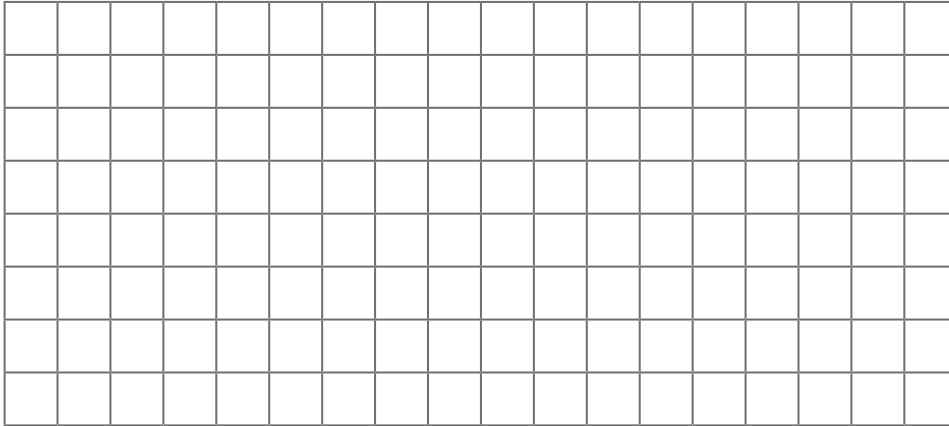
18. The coordinates of the vertices of a triangle are $A(6, 1)$, $B(1, 1)$, and $C(1, 5)$. Find the area of triangle ABC .



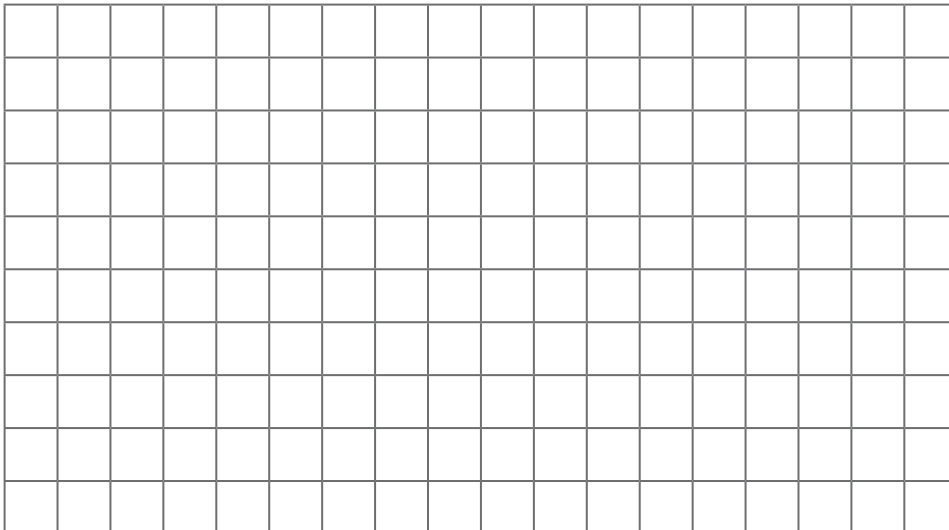
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19. The coordinates of the vertices of a triangle are $P(-4, -5)$, $Q(-6, -1)$, and $R(2, -1)$. Find the area of triangle PQR .



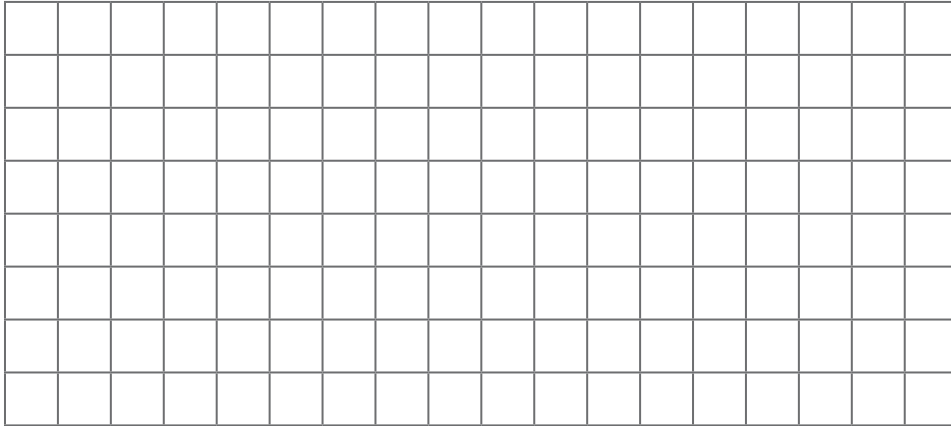
20. The coordinates of the vertices of a triangle are $X(8, 4)$, $Y(1, 0)$, and $Z(1, 6)$. Find the area of triangle XYZ .



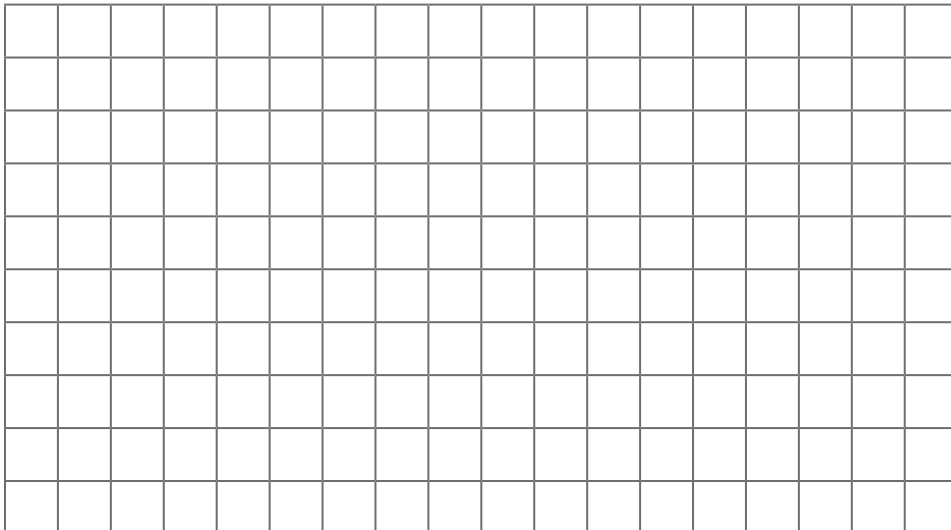
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21. The coordinates of the vertices of a triangle are $D(-5, 3)$, $E(-5, -2)$, and $F(4, -1)$. Find the area of triangle DEF .



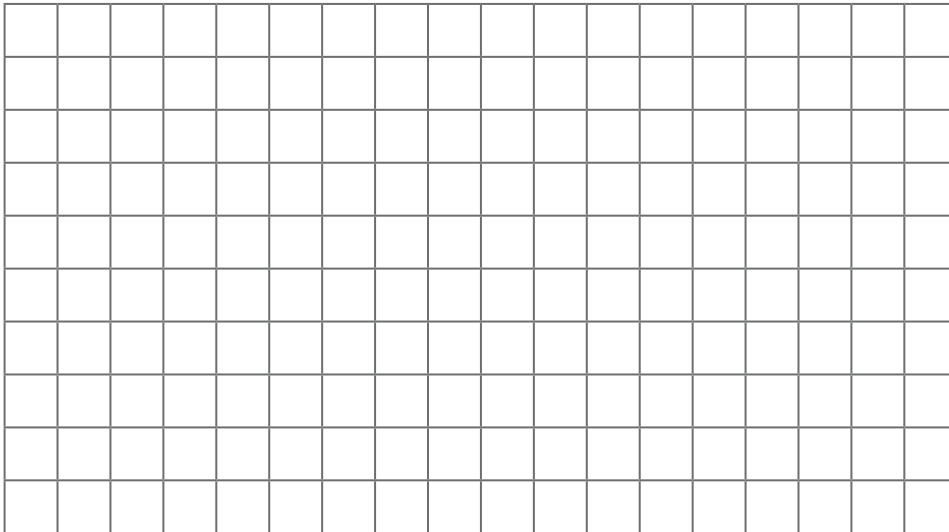
22. The coordinates of the vertices of a triangle are $L(-9, 5)$, $M(-3, 0)$, and $N(1, 0)$. Find the area of triangle LMN . (Hint: Draw a rectangle around triangle LMN .)



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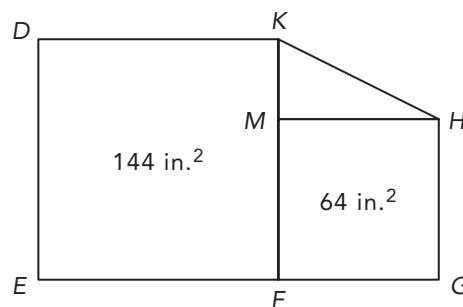
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23. The coordinates of the vertices of a triangle are $G(-4, -3)$, $H(2, 2)$, and $K(5, 2)$. Find the area of triangle GHK .



Solve. Show your work.

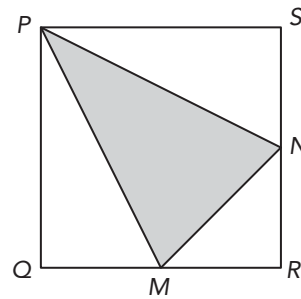
24. Figure $DEFGHK$ is made up of two squares and a triangle. The areas of the squares are 144 square inches and 64 square inches. Find the area of the figure.



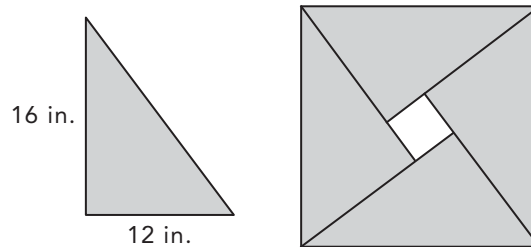
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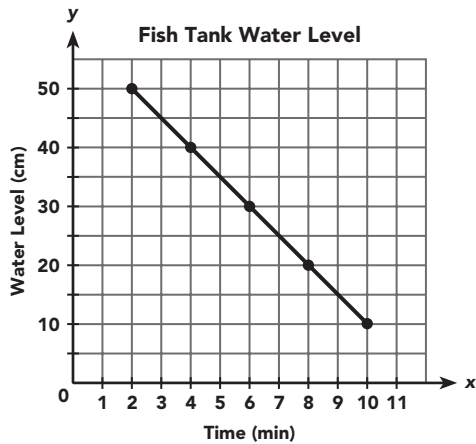
25. Square $PQRS$ has a perimeter of 160 inches. Point M is the midpoint of \overline{QR} , and point N is the midpoint of \overline{SR} . Find the area of triangle PMN .



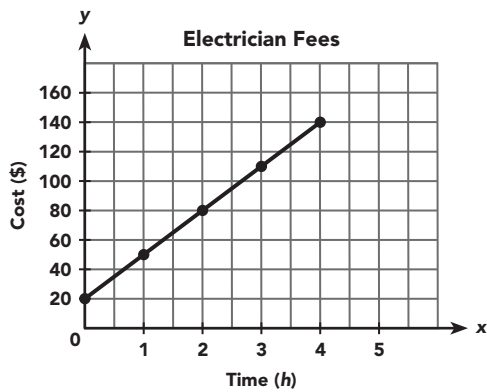
26. A right triangle has a height of 16 inches and a base of 12 inches. Four such triangles are arranged to form a large square with a small square at the center, as shown. Find the side length of the larger square.



2. a) 40; 30; 10



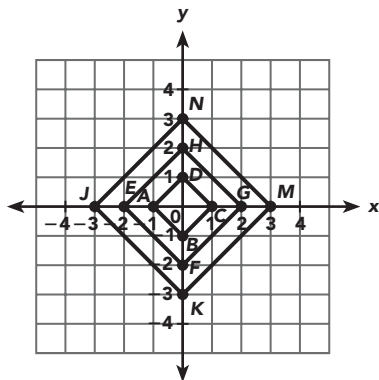
- b) 45 centimeters
 c) 7 minutes
 d) 12 minutes
 e) 5 centimeters per minute
3. a) 80; 110; 140



- b) \$65
 c) 2.5 hours
 d) $95 \div 2.5 = 38$
 \$38 per hour
 e) $C \geq 20$

Brain @ Work

1. a)



b) Area of $ABCD = \frac{1 \cdot 2}{2} \cdot 2 = 2 \text{ cm}^2$

Area of $EFGH = \frac{1 \cdot 2}{2} \cdot 2 = 8 \text{ cm}^2$

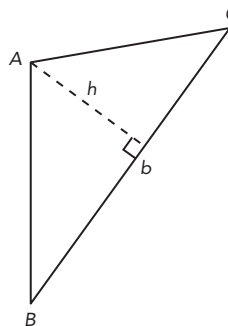
Area of $JKMN = \frac{3 \cdot 6}{2} \cdot 2 = 18 \text{ cm}^2$

- c) The area of figure $ABCD$ is 2 times the square of 1.
 The area of figure $EFGH$ is 2 times the square of 2.
 The area of figure $JKMN$ is 2 times the square of 3.
 $1^2 \times 2 = 2$
 $2^2 \times 2 = 8$
 $3^2 \times 2 = 18$

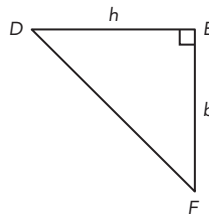
Chapter 10

Lesson 10.1

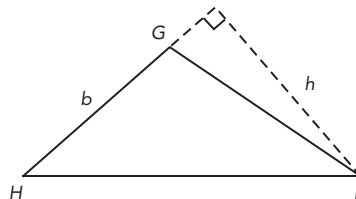
- Answers vary. Sample: base: AB ; height: AC
- Answers vary. Sample: base: PR ; height: QT
- Answers vary. Sample:



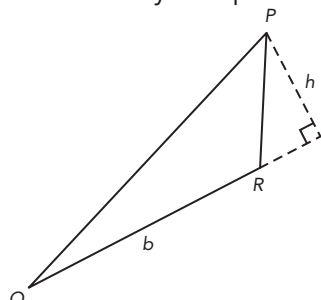
4. Answers vary. Sample:



5. Answers vary. Sample:



6. Answers vary. Sample:



7. $\frac{1}{2} \cdot 14 \cdot 8 = 56$ square inches

8. $\frac{1}{2} \cdot 7 \cdot 18 = 63$ square centimeters

9. $\frac{96 \cdot 2}{16} = 12$ centimeters

10. $\frac{96 \cdot 2}{8} = 24$ centimeters

11. $\frac{135 \cdot 2}{15} = 18$ yards

12. $\frac{135 \cdot 2}{27} = 10$ yards

13. $\frac{1}{2} \cdot 26 \cdot 12 = 156$ square feet

14. $28 \cdot 3 = 84$ square inches

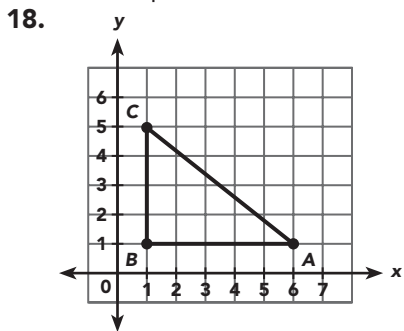
15. Base of the shaded region
 $= 96 \div 3 = 32$ in.
 Area of the shaded region
 $= \frac{1}{2} \cdot 32 \cdot 16 = 256$ square inches

16. Area of XYZ = $\frac{1}{2} \cdot 18 \cdot 12$
 $= 108$ in.²
 Area of WZY = $\frac{1}{2} \cdot 12 \cdot (18 - 13)$
 $= 30$ in.²
 Area of WXY = $108 - 30$
 $= 78$ square inches

OR

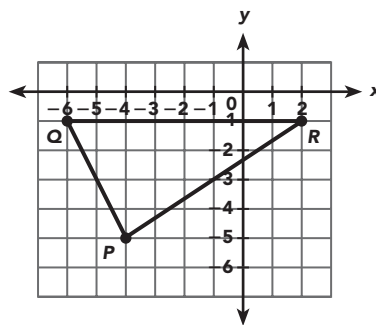
Area of WXY = $\frac{1}{2} \cdot 13 \cdot 12$
 $= 78$ square inches

17. $EN = 9 \cdot 2 - 12 = 6$ in.
 Area of triangle EMN
 $= \frac{1}{2} \cdot 6 \cdot 9$
 $= 27$ square inches



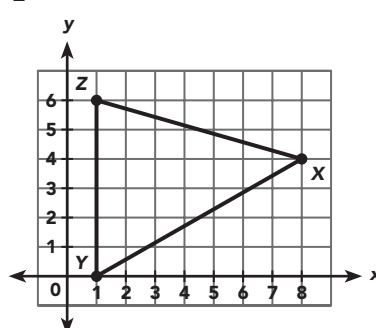
$\frac{1}{2} \cdot 5 \cdot 4 = 10$ square units

19.



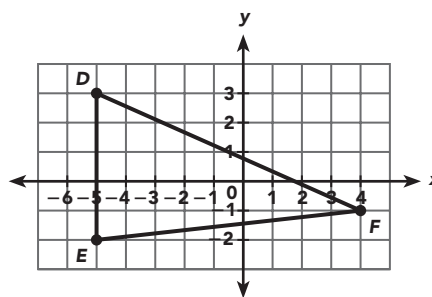
$\frac{1}{2} \cdot 8 \cdot 4 = 16$ square units

20.



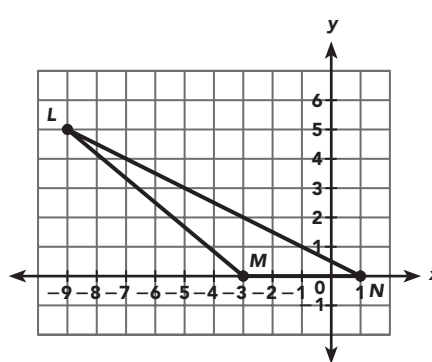
$\frac{1}{2} \cdot 6 \cdot 7 = 21$ square units

21.



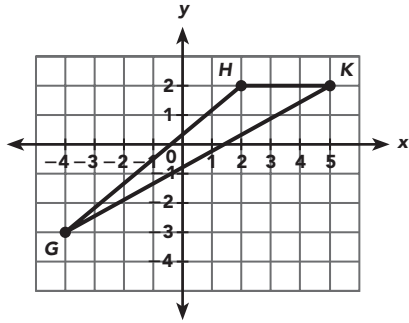
$\frac{1}{2} \cdot 8 \cdot 5 = 20$ square units

22.



$\frac{1}{2} \cdot 4 \cdot 5 = 10$ square units

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

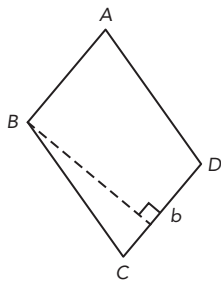
25. Length of 1 side:
 $160 \div 4 = 40$ in.
 By observation, triangles PQM and NPS together make up $\frac{1}{2}$ of the square, and triangle MNR make up $\frac{1}{8}$ of the square.
 $1 - \frac{1}{2} - \frac{1}{8} = \frac{8}{8} - \frac{4}{8} - \frac{1}{8} = \frac{3}{8}$
 So, the area of triangle PMN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

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

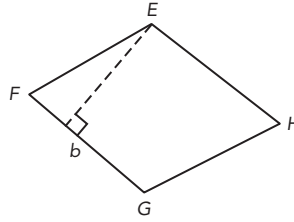
26. Length of the small square
 $= 16 - 12 = 4$ in.
 Area of the larger square
 $= 4 \left(\frac{1}{2} \cdot 16 \cdot 12 \right) + 4 \cdot 4 = 400$ in.²
 Side length of the larger square
 $= \sqrt{400} = 20$ inches

Lesson 10.2

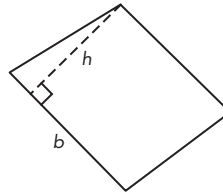
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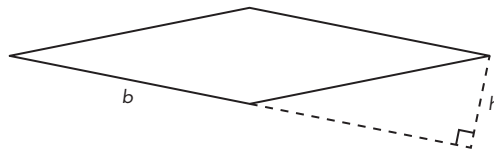
2.



3. Answers vary. Sample:



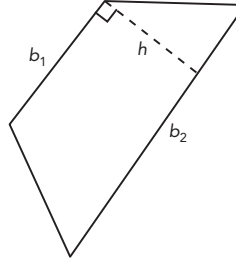
4. Answers vary. Sample:



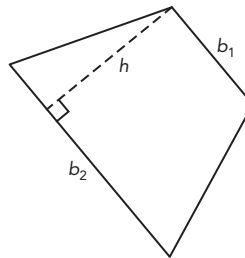
5. $26 \cdot 18 = 468$ square inches

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

7.



8.



9. $\frac{1}{2} \cdot 12(15 + 20)$
 $= 210$ square inches

10. $\frac{1}{2} \cdot 11(14 + 18)$
 $= 176$ square centimeters

11. $207 \div 9 = 23$ inches

12. $112 \div 16 = 7$ inches

13. Area $= \frac{1}{2}h(10 + 17) = 108$ cm²
 $h = 108 \cdot 2 \div 27$
 $= 8$ centimeters

14. Area $= \frac{1}{2}h(30 + 20) = 375$
 $h = 375 \cdot 2 \div 50 = 15$ feet